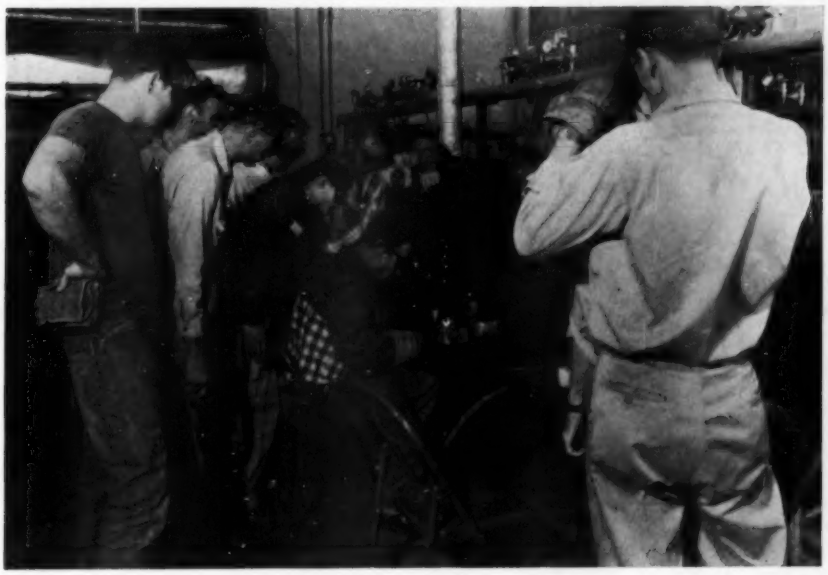
Volume 48, No. 4 April, 1959

THE SHOP TEACHERS' PROFESSIONAL MAGAZINE

INDUSTRIAL ARTS AND VOCATIONAL EDUCATION



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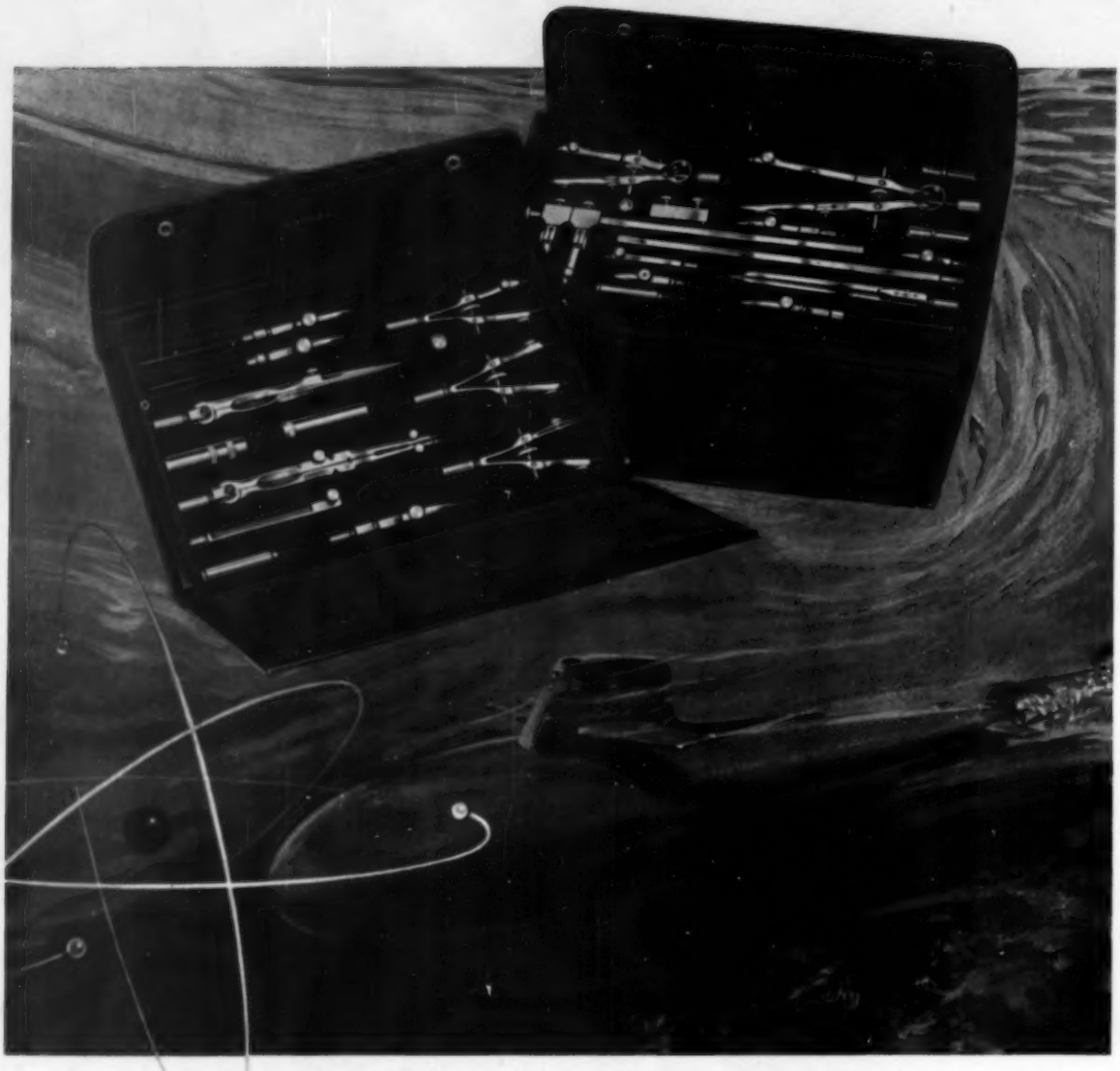

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APRIL
1959

VOL. 43 NO. 4

Industrial Arts and Vocational Education

The Shop Teachers' Professional Magazine

Published on the 15th of the month preceding the date of issue by THE BRUCE PUBLISHING CO., 400 North Broadway, Milwaukee 1, Wis. • CENTRAL OFFICE: 20 North Wacker Drive, Chicago 6, Ill. • EASTERN OFFICE: 233 Broadway, New York 7, N. Y.

This Month's Cover

This month's cover shows welding students as they watch Instructor George Hunt demonstrate oxyacetylene-type welding.

Photograph by Dick Merritt, student in the graphic-arts department at Tucson Senior High School, Tucson, Ariz., when the picture was made.

Harry A. Goldstein is instructor of photography at this school, and sent the picture to us.

National Society for
Crippled Children and Adults
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Chicago 12, Ill.

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Articles Indexed. — The articles contained in this Magazine are regularly indexed in "The Readers' Guide to Periodical Literature," and "Education Index."

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Association News

COMING CONVENTIONS

Mar. 27–28. Washington Industrial Arts Association, at Shadle Park High School, Spokane, Wash. Secretary, Carl Schmidt, N. 120 Locust St., Spokane, Wash.

Apr. 2–4. Indiana Industrial Education Association, at Hotel Antlers, Indianapolis, Ind. Secretary, John H. Hinds, High School, Elwood, Ind.

Apr. 9–11. Michigan Industrial Arts Association, at Pantlind Hotel, Grand Rapids, Mich. Secretary, John Koenig, 4628 Flajole Road, Midland, Mich.

Apr. 9–11. Michigan Industrial Education Society, at Civic Auditorium, Grand Rapids, Mich.

Apr. 10. Industrial Education Conference, at Memorial Union, Ames, Iowa. Chairman, Lowell L. Carver, 101 Industrial Arts Bldg., Iowa State College, Ames, Iowa.

Apr. 11–15. Pacific Arts Association, at Arizona State University, Tempe, Ariz. Secretary, Mrs. Louise Haskin, Arizona State University, Tempe, Ariz.

Apr. 13–16. Department of Audio-Visual Instruction (NEA), at Olympic Hotel, Seattle, Wash. Secretary, Mrs. Mickey Bloodworth, Department of A-V Instruction — NEA, 1201 Sixteenth St., N.W., Washington 6, D. C.

Apr. 16–18. New York State Vocational and Practical Arts Association, at New Yorker Hotel, New York, N. Y.

Apr. 17–18. West Virginia Vocational Association, at 4-H Camp, Jackson's Mill, W. Va. Secretary, Fred W. Eberle, 1211 Grishaber St., South Charleston 3, W. Va.

Apr. 18–19. Missouri Industrial Education Association, at University of Missouri Education Building, Columbia, Mo. Secretary, Maurice L. Stewart, State Department of Education, Jefferson City, Mo.

Apr. 22–25. American Industrial Arts Association, at Lafayette Hotel, Long Beach, Calif. Secretary, Dr. Kenneth W. Brown, P.O. Box 2626, Buffalo 26, N. Y.

Apr. 30–May 2. Wisconsin Association for Vocational and Adult Education, at Northland Hotel, Green Bay, Wis. Secretary, C. D. Rejahl, 211 North Carroll St., Madison, Wis.

May 7–8. Oswego Industrial Arts Spring Conference, at Teachers College, Oswego, N. Y. Program chairman, Arthur Hauler, Teachers College, Oswego, N. Y.

May 31–June 5. Wyoming Vocational Agriculture Teachers Association, at Jackson, Wyo. Secretary, Clark Allen, Cheyenne, Wyo.

June 8–12. Idaho Vocational Association, at Idaho State College, Pocatello, Idaho. President, Mrs. Helen Morgan, Burley, Idaho.

WASHINGTON INDUSTRIAL ARTS ASSOCIATION

The Washington Industrial Arts Association will hold its annual convention at the New Shadle Park High School in Spokane, Wash., on Friday and Saturday, March 27 and 28.

Panel discussions are being planned in the areas of (1) industrial arts and the gifted child; (2) tool panels; (3) science and industrial arts; (4) industry and industrial arts.

State association officers for the current year are: Wayne H. Chapman, president; Melvin Kirkland, first vice-president; Robert Helgeson, second vice-president; Carl H. Schmidt, secretary; and Gene Rieger, treasurer. — *Dury A. Fox, publicity.*

VIRGINIA COUNCIL OF INDUSTRIAL EDUCATION CLUBS

The annual spring meeting of the Virginia Council of Industrial Education Clubs is scheduled for the John Marshall Hotel, Richmond, Va., on April 18. The theme of the meeting will be "Design for Modern Living."

Registration and a tour of Richmond area industries will fill the morning program. In the afternoon, there will be a group of four clinics, each of thirty minutes in length, featuring designers from four nationally known industries. Each clinic will be repeated four times so that all persons attending the meeting will have an opportunity to hear all four designers.

The banquet session will be held in the evening in the ballroom of the hotel, with Dr. Davis Y. Paschall, Virginia State Superintendent of Public Instruction, as the guest speaker.

Both competitive and noncompetitive exhibits of student projects will be held in the lobby and ball room of the hotel in conjunction with the meeting.

WAYNE STATE HOST TO ENGINEERING SOCIETY

The division of engineering graphics of the American Society for Engineering Education (ASEE) held its annual mid-winter meeting, Wednesday through Friday, January 21–23, 1959, at Wayne State University, Detroit.

About 300 engineers from educational and industrial institutions across the country were in attendance.

The meeting got under way at 6:30 p.m., Wednesday with an executive committee dinner at the Engineering Society of Detroit headquarters in the Rackham Memorial Building.

Technical sessions, centering on the theme, "Graphics for Tomorrow," were held at the McGregor Memorial Conference Center over the two days.

Graphics, formerly called engineering drawing, is the "shorthand" of the profession, encompassing everything from simple sketches to elaborate blueprints. The graphic division is the largest in ASEE.

On Thursday a technical session on teaching techniques in graphics was held, and a technical session dealing with "New Horizons in Graphics," was conducted. Another technical session on "Graphics: An Engineering System or Science," was held on Friday.

A banquet was offered at 6:30 p.m., on Thursday at the Engineering Society of Detroit.

An afternoon tour of the General Motors Technical Center in suburban Centerline was conducted at the end of the Friday meetings.

AMERICAN WELDING SOCIETY

The 40th Annual Convention and Welding Show of the American Welding Society will be held at the Sherman Hotel and the International Amphitheatre at Chicago, Ill., April 6 to 10, 1959.

The Welding Show opens at noon Tuesday, April 7. The hours are as follows:

(Continued on page 6A)

A B&D Valve Refacer speeds learning with the tool mechanics prefer!

Speed . . . ease of operation—two of many outstanding features!

Many instructors are taking a second look at their valve refacers and finding them out-of-date. Graduates complain they've been trained on old-fashioned machines.

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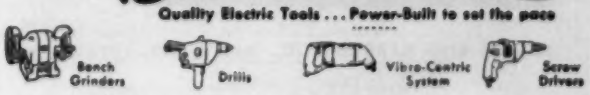

ASSOCIATION NEWS

(Continued from page 4A)

Tuesday, April 7 — 12:00 noon to 10:00 p.m.
Wednesday, April 8 — 10:00 a.m. to 10:00 p.m.
Thursday, April 9 — 10:00 a.m. to 6:00 p.m.

On Wednesday, April 8, a panel discussion on maintenance welding will be held from 2:00 p.m. until 4:30 p.m.

Technical sessions at the Hotel Sherman are sponsored by the American Welding Society and the American Institute of Electrical Engineers. The five-day program is one of the most comprehensive ever attempted.

The technical program is as follows:

Monday, April 6 (afternoon) — Nuclear Power Equipment, Stainless Steels, Processes and Procedures.

Tuesday, April 7 (morning) — Arc-Welding Power Supplies, Nuclear Power Equipment, Cutting (afternoon) — Welding-Arc Fundamentals, Heat Effects on Steel Weldments, Pipe Lines.

Wednesday, April 8 (morning) — Resistance Welding, Brittle Fracture, Design Considerations (afternoon) — Welding in Ship Structures, Resistance and Ultrasonic Welding, Titanium and Zirconium.

Thursday, April 9 (morning) — Welded Structures, Weldability of Steel and Cast Iron, Aluminum Alloys.

Friday, April 10 (morning) — Welded Structures, Gas-Shielded Welding, Brazing.

Other high lights of the week include the official opening and business session addressed by G. O. Hoglund, president of AWS., national awards, Adams Lecture, Educational Lecture Series, the president's reception, annual banquet, the chain-cutting ceremony and exhibitors' luncheon, the Ohio State University Student Alumni Dinner, the Board of Directors' Meeting, plant tours, and a special Ladies' Program.

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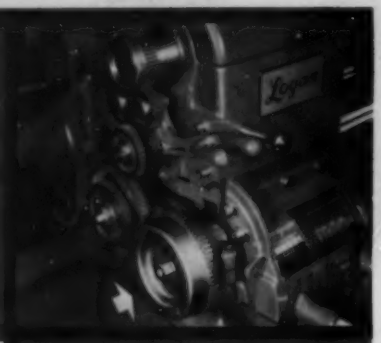
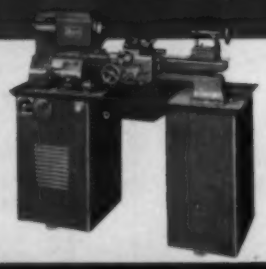


12" Lathe



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Personal News

DR. POLLOCK AT SOUTHERN ILLINOIS UNIVERSITY

Dr. John M. Pollock, a member of Zeta Chapter of Iota Lambda Sigma, recently joined the industrial education department of Southern Illinois University at Carbondale, Ill. Professor Pollock came to Southern Illinois University after serving three years in Nicaragua where his duties with the International Cooperation Administration included supervision of teaching staff, organization of shops, and development of curriculum materials.

Dr. John M. Pollock

Dr. Pollock is a native of Holdenville, Okla. He received both his B.S. and M.S. degrees from Oklahoma A. & M. College, and his B.A.A. in Industrial Design from the Kansas City Art Institute and School of Design. He received a doctor of education degree in 1954 from George Peabody College for Teachers. He formerly taught industrial arts at Oklahoma A. & M. College and the University of Georgia in addition to service with the U. S. Army.

His areas of specialization are drawing and design, woodworking and cabinetmaking, arts and crafts, and organization and administration of industrial arts. — *Marvin Johnson.*

THOMAS M. HAHN, JR.

Thomas M. Hahn, Jr., who since 1954 has been head of the department of physics at Virginia Polytechnic Institute, Blacksburg, Va., will become the new dean of arts and sciences at Kansas State College, Manhattan, Kans. He will assume his new duties on September 1, 1959.

Mr. Hahn is a native of Lexington, Ky., and was educated in the public schools of Lexington and Chicago, Ill. He returned to the University of Kentucky for his B.S. in physics, which he received in 1945. He later was a lecturer in physics at the Naval Academy, a physicist at the United States Naval Ordnance Laboratory, and a research assistant at Massachusetts Institute of Technology before receiving his Ph.D. in physics from MIT in 1950. From 1950 to 1954, he was director of graduate study in physics and director of

(Continued on page 13A)

STANLEY SHOP TALK

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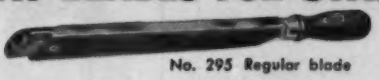

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These blades fit file type SURFORM
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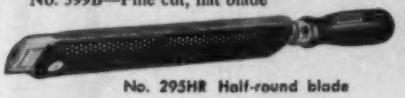
No. 399B—Fine cut, flat blade



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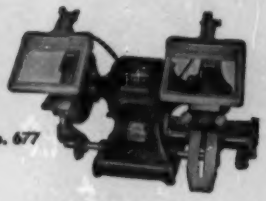

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H264

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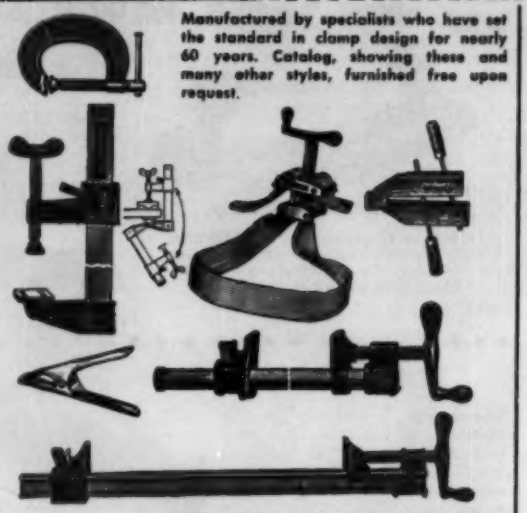

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This new Walker-Turner "Light-Heavyweight" is a natural for school shop instruction—safe, dependable, accurate, and economical. It has the ruggedness to stand up under rough student handling and still last for years, with little or no servicing needed. And for added safety, the pulleys and V-belt in this unit are totally enclosed in an all-steel housing.

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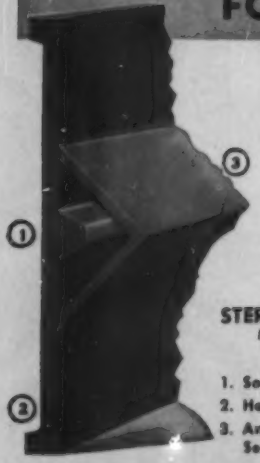

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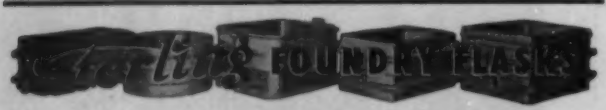

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MACHINE TOOLS

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Any way you judge them, Walker-Turner "Light-Heavyweights" are the finest, most economical metalworking tools for school shop instruction. They're safety-engineered to give maximum student protection, and are built extra rugged to take rough treatment and still give years of accurate service with little or no maintenance problems.

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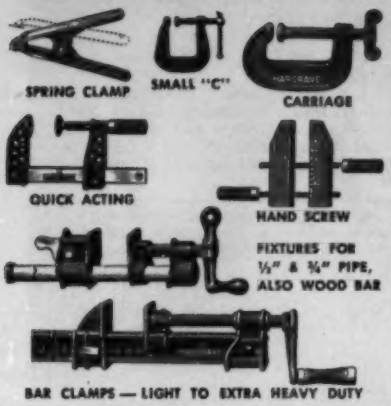

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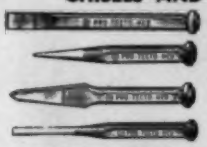

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PERSONAL NEWS

(Continued from page 6A)

nuclear accelerator laboratories at the University of Kentucky.

Mr. Hahn is the author of numerous research articles published in technical journals for physicists. Most of his work has been with high voltage accelerators and he has made many studies on distribution of gamma rays from various nuclear reactions. He is international editor for Nuclear Energy Engineer, and has been a consultant to Reynolds Metals Company, Leeds and Northup Company, the Atomic Energy Commission, and the University of Puerto Rico. He has been a prolific speaker in recent years, particularly in the fields of general education and popular science subjects.

HOMER C. ROSE RECEIVES APPOINTMENT

Homer C. Rose has been appointed acting director of training of the newly created Federal Aviation Agency. Mr. Rose was formerly Chief of Proficiency Development Division, Civil Aeronautics Administration.

The new agency brings together several of the organizations concerned with aviation, including the Air Modernization Board, the Civil Aeronautics Administration, and part of the Civil Aeronautics Board. In addition, representatives of the Army, Navy, and Air Force are being assigned.

U. OF M. IS HOST TO HERNANDEZ

Lorenzo Garcia Hernandez, director of vocational education for Puerto Rico, and currently acting secretary of education for the Commonwealth, recently spent a week as a guest of the University of Miami, as part of the university's program for inter-American friendship.

Under the direction of Professor John R. McElheny, Mr. Hernandez spent the visit observing the industrial arts education program at the University of Miami, and making various studies of agricultural and vocational education at the University's experimental farm at south campus.

On January 15 the University chapter of Epsilon Pi Tau, international industrial arts honorary fraternity, made him an honorary member at a banquet.

The presentation was made by Dr. Walter R. Williams, Jr., vocational education director for the state of Florida, who was the principal speaker at the banquet.

On January 16 a faculty reception was held for him. Dean John R. Beery of the education school, was official host.

An authority on agricultural instruction, Mr. Hernandez has served as adviser on vocational agriculture to many countries in Latin America, and on special missions of the Organization of American States and UNESCO.

♦ Harry W. Kroll, assistant principal at East Senior High School, Rockford, Ill., until last summer, is now in charge of all guidance counseling in the Senior High School at Melbourne, Fla.

Mr. Kroll came to Rockford, Ill., from the Duluth area in 1939.

♦ James A. Walker, formerly Art Consultant, Greenville City Schools, Wahl-Coates Laboratory School, East Carolina College, Greenville, N. C., is now at Northern High School, Richland, Mich., and is also working for the Mott Foundation in Flint, Mich.

(Continued on page 16A)

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ECONOMY aprons come in TAN, BLUE, GREEN, OR ORANGE. Colors can be used to designate different jobs within a class, or TAN can designate woodworking, BLUE metal working, GREEN automotive, etc.

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SIZE	UP TO 12	13 TO 24	25 TO 49	50 TO 99	100 UP
24 x 28	$1.05	$1.00	$ .95	$ .90	$ .85
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Without PERSONNEL PLAN CARDS. BLUE denim and BLUE/WHITE hickory stripe denim. 24x36 in BLUE denim only

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28 x 36	1.30	1.25	1.20	1.15	1.10
28 x 42	1.40	1.35	1.30	1.25	1.20
28 x 46	1.45	1.40	1.35	1.30	1.25

Prices slightly higher west of Rockies. Sizes shown are "cut sizes" before hemming

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Included with your apron order. Solves many problems of class management. Tells you how to organize your class just like management system used in industry. Ten chapters - over 60 pages with many illustrations and charts. Well written by shop authorities.

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LC CLASSMAN - Pencil pocket. Two lower pockets. Box style back with belt. Matching metal snaps Side vents.
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. . . the experience of working on the same type of high-speed planers they will eventually use in their trade.

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A quality tool accurate and easy to operate. Versatility makes it ideal for training. Popular in commercial sheet metal shops for light production, box and pan work. Replaceable bronze bushings provide long machine life. Available in 3 and 4 ft. models, universal or plain. Write for Bulletin U 322I.

Rated Capacity: 3/16 flange on 22 gage mild steel, full brake length. Fingers of case hardened steel in widths of 2, 3 and 4 inches permit 3 inch box and pan depth. Other Prices of the Bench Series:

4 ft. Universal,	$220.00
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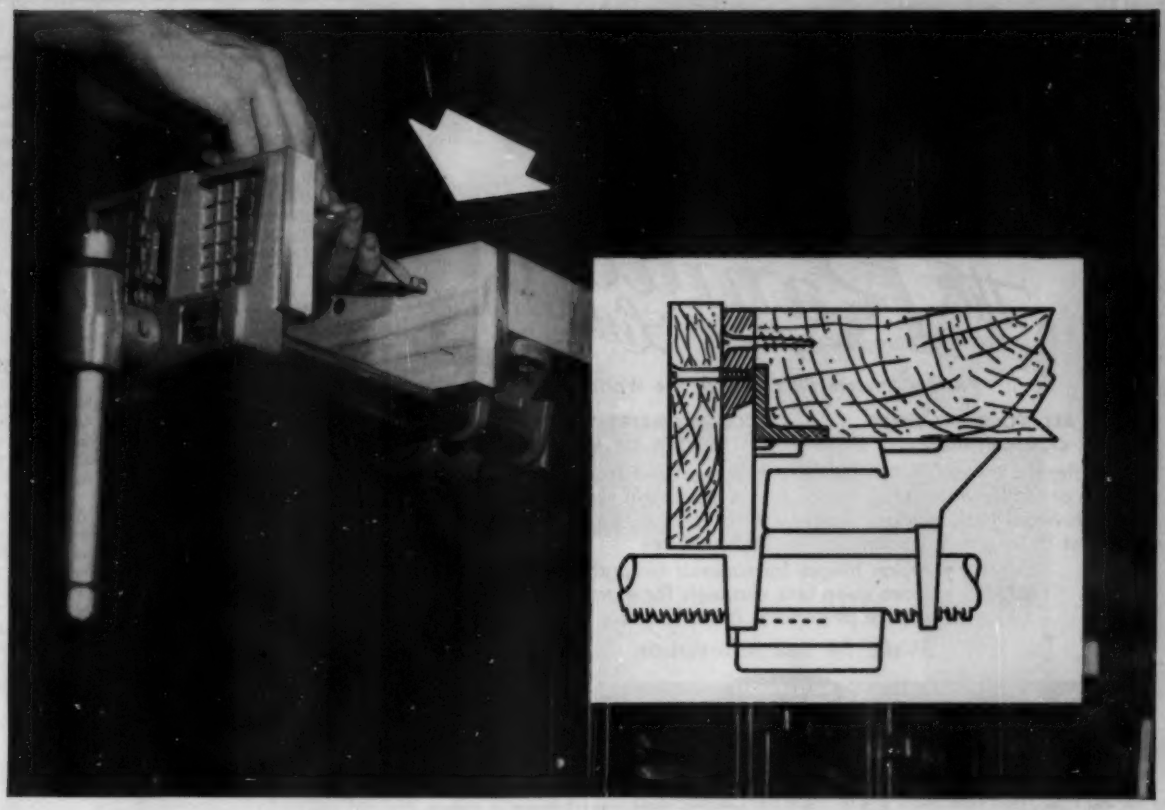

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Wilton is your best shop equipment buy and here's why: Wilton Vises are safer, more rugged and are the best quality on the market today. Wilton's exclusive features tell the whole story.

- THE ALL NEW INTEGRAL FRONT JAW DESIGN IS BOY-PROOF AND INJURY-PROOF — THERE ARE NO EXPOSED NUTS.
- REPLACEMENT OF WOOD FACES WITHOUT LOOSENING VISE. Inset shows Vise mounting holes and Wilton's exclusive separate jaw mounting holes; Wilton furnishes the counter sunk screws.
- STRONG AND LIGHT SOLID ALUMINUM HANDLES (with rubber bumpers) available without extra cost.
- WEAR PROOF "RAPID TITAN" (quick acting) STEEL NUT.
- CALCULATED SHEAR PIN prevents intentional damage.
- EASY, FAST MOUNTING open end slots fit over lug bolts under bench top.
- UNCONDITIONALLY GUARANTEED.

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Wilton Machinists Vises are tops for your metal working shops, too.

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PERSONAL NEWS

(Continued from page 13A)

♦ Eugene Levy, formerly at E. B. Shallow Junior High School, Brooklyn, N. Y., is now affiliated with the Plainview-Old Bethpage Public Schools, Central School District No. 4, at Plainview, N. Y.

♦ John C. McCrory, formerly director of industrial arts at Greenville, Pa., is now assistant professor of the industrial arts department at State Teachers College, California, Pa.

♦ E. C. Russell, director of vocational education in Pontiac Public Schools, Pontiac, Mich., for over 25 years, passed away December 19, 1958.

♦ Carl Turnquist has been promoted to assistant principal of Cass Technical High School, Detroit, Mich.

♦ Lloyd F. Hutt, veteran mechanical drawing teacher at Grand Rapids Central High School, Grand Rapids, Mich., resigned at the end of the first semester. He assumed the full-time job of treasurer-manager of the Grand Rapids Teachers Credit Union.

♦ James E. Bowman, member of the industrial arts department staff at Central Michigan College, received the doctor of education degree from Michigan State University at the fall term graduation. His thesis, "Basic Mathematics Needed to Teach Industrial Arts in the Public Schools," was written from a nation-wide study with data available from 41 states.

♦ Adolph Drapeau of East Jordan, Mich., has accepted the industrial arts job at Ellsworth.

♦ Fred W. Swan, who served as assistant to the dean of Trade and Industrial Division of Ferris Institute, has been appointed to acting dean of the Collegiate Technical Terminal Division of Ferris.

♦ Thad Diebel, drafting instructor of the T. & I. faculty, has been released of his teaching assignments to act in the capacity of assistant to the dean.

♦ Eugene Watkins is chairman of the Affiliations Committee of the AIAA.

News Notes

SUMMER WORKSHOP ON CRAFTS

The Industrial Arts Department of Berea College, Berea, Ky., are announcing their First Annual Summer Workshop on Crafts to be conducted in two four-week sessions — June 8 to July 3, and July 6 to August 1, 1959.

The Summer Workshop Program in Crafts offers instruction in the following areas:

Wood I — includes bench, machine, cabinet, turning, and carving with up-to-date hand and power equipment conveniently located in a shop area of more than 8000 sq. ft.

Instructor, Rude Osolnik, M.S., B.S., Bradley Polytechnic Institute, 1937; M.S. 1950; additional graduate work at the University of Colorado.

Weaving I — the opportunity to learn the mechanics of a four-harness loom, to experiment with threads, to draft and to weave finished material.

Instructor, Sally Wilkerson, A.B., Berea, 1942.

Pottery I — complete pottery making processes, forming, glazing, surface treating, firing and technical investigations. Work scaled in maturity to the needs of the individual.

Instructor, James Bobbitt, M.F.A., A.B., De Pauw, 1948; A.M., Indiana, 1952; M.F.A., 1952.

(Continued on page 20A)

"OLIVER" PRESENTS NEW SPEED LATHE WITH OUTSTANDING FEATURES FOR SCHOOL SHOPS

New Engineering Concept Guarantees Greater Strength, More Capacity, Maximum Safety – in Distinctive, Modern Design

"OLIVER" NO. 167 WOODWORKING-METAL SPINNING LATHE

Featuring a completely new concept in design and construction, this lathe incorporates the advantages of welded steel construction. The latest techniques in steel die forming and arc and resistance welding put strength where needed, make this positively the strongest, most rigid lathe on the market today.

HERE'S WHY THE "OLIVER" NO. 167 IS STRONGER, SAFER, HAS MORE CAPACITY

2 TO 3 TIMES MORE RIGID with welded steel construction, new manufacturing techniques.

MECHANICAL INTERLOCK with electrical control system permits starts at slow speed only.

MORE CAPACITY Full 45 inches between centers is more than any other lathe.

Turn Page for Complete Technical Details

OLIVER MACHINERY COMPANY / GRAND RAPIDS 2, MICHIGAN

Latest "Oliver" Lathe has amazing features of strength and accuracy . . . turns wood and spins metal with ease

Headstock

The all-welded steel unit type construction of the headstock, has heavy-duty spindle and high capacity ball bearings. Spindle speed control lever starts and stops Lathe. Headstock is aligned with a heavy tongue fitting between bed rails, and securely clamped in position. It is removable from bed without disturbing mechanism in unit.

Heavy-duty spindle has center hole to facilitate removal of centers, and a No. 2 Morse taper bore for holding centers. Spindle has permanently lubricated ball bearings of high capacity. The bearing at right end is locked to provide adequate end thrust capacity in both directions. Bearing housings are bored after welding to insure accuracy.

Variable pitch sheave is adjusted in unison with similar sheave mounted on motor shaft, operated by speed control lever. Movement of lever operates hardened steel cam mechanism of special design. Spindle lock functions with speed control handle and cannot be engaged unless motor power is off. It is held in locked position automatically. This permits use of both hands to remove or mount face plates. You cannot start motor when spindle lock is engaged.

Motor

The driving motor is mounted below the headstock inside the cabinet leg. It can be removed from the Lathe without disturbing headstock. It is rated 1 H.P., 1800 R.P.M. and has high torque features needed for wood turning and metal spinning. It also has adequate heat dissipating capacity.

The Belt Drive

A standard wide-face type V-belt connects the variable speed sheaves. It runs with minimum noise and vibration. It can be removed and replaced in less than five minutes without disassembling headstock spindle, motor, or related parts. Drive is set at factory for any speed from 600 to 3600 R.P.M. Spindle speeds up to 4100 R.P.M.can be furnished on order. For safety reasons, speeds for school shops beyond 3600 R.P.M. are not recommended.

The Bed

A completely new concept in Speed Lathe design and construction is found in the "Oliver" No. 167. This Lathe is the result of research by our engineering staff. It incorporates welded steel construction and makes use of latest techniques in steel die forming and arc and resistance welding to put strength where needed to make this the strongest, most rigid Lathe on the market. Since steel is two to three times more rigid and stronger than cast iron, its use results in greater strength while saving weight and shipping costs. The ductility of steel eliminates any chance of cracked or broken castings.

Bed is normally furnished in plain type as illustrated. It is 6⅛" wide by 6¾" deep. Has a 2¾" diameter steel tube running lengthwise. Has solid steel ways 2" wide, ¾" thick. Lathe is also available with a gap-type bed, for using face plates up to 19" diameter, and turning a piece up to 4" wide.

Legs

Cabinet type legs are fabricated of 14-gauge steel, all-welded construction. They provide maximum clearance for operator's feet. A fully enclosed storage space has 10½" x 19" hinged, louvered door.

Tailstock

The tailstock, of open side design, 7" long by 6" wide, is secured to the bed by a positive quick-acting lever clamp. The ground steel spindle is bored for No. 2 Morse taper. A special non-galling clamp locks spindle in any position. The tailstock center is removed by backing off the tailstock spindle. A heavy duty spindle nut is positioned in hole bored perpendicular to spindle screw without use of threads or screws. Spindle and nut are of adequate size and capacity to handle thrust loads required in metal spinning.

Hand Tool Rest Holder

The all-steel unit is quickly adjusted to any position. It can be locked securely on bed by turning front clamp lever. The rest clamp allows tool rest to be set above or below center of work.

Electrical Control — Standard

Standard electrical equipment includes overload protection, a dust tight start-stop switch mounted inside the headstock, and an incoming service conduit box. All control components are rated for 1 H.P. motor loads. For safety the motor starts only when the speed control handle is moved from the stop to start position. It can only be started at slow speed, and then moved to any higher speed position.

Electrical Control — Special

A complete magnetic control is available with overload and low voltage protection. Motor will not re-start in event of power interruption.

Also available is a special control requiring the use of both hands to start the motor. It includes an emergency STOP button. When using this control operator depresses START button with one hand and moves speed control handle from OFF to minimum-speed position with the other to start the motor. The emergency STOP button stops motor at any time, without returning speed control handle to STOP position.

Interchangeable Accessories

Owners of "Oliver" No. 159 and No. 51 Speed Lathes will find that face plates, centers and other accessories can be used on this new No. 167 Speed Lathe.

Rear End Turning

This Lathe is regularly furnished with an 8" Combination handwheel and face plate for rear end turning at left end of headstock spindle.

Machine Finish

Surfaces of this Lathe are attractively finished with the newest type of paint, securely bonded to the metal surface to resist chipping.

SPECIFICATIONS

CAPACITY
12⅝" diameter over bed.
45" between centers with standard 5' bed.
10¼" diameter over rest holder.

MOTOR
1 H.P., 1800 R.P.M.

HEADSTOCK SPINDLE
No. 2 Morse Taper in right hand end.
Threaded on both ends.
⅝" hole entire length.

SPINDLE BEARINGS
Oversize ball bearings, permanently lubricated.

TAILSTOCK
Plain open side type 7" long, 6" wide.
No. 2 Morse Taper bore.
Spindle travel 4".

FLOOR SPACE (at floor line)
22" x 66" for standard 5' bed.
Height of bed from floor 37".

EQUIPMENT
¾" Spur center.
¾" cup center.
2¼" Screw chuck.
6" Inside face plate.
6" Tool rest.
12" Tool rest.
Tool Rest Holder.
8" combination handwheel and face plate.
Knockout rod.
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Industrial Arts and Vocational Education
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A Revised Program of Trade and Technical Education

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This is a report of the program of trade and industrial education as it now functions in the Lincoln, Neb., schools. It is also a report of a project of research that lead to the revision of the program. The research project was carried out as a co-operative venture by the staff, former graduates, and industrial representatives of the community.

Changes in two of the curriculums in the area and the addition of a third grew out of a conviction that the former programs of study did not meet the needs of today's students.

Evidence of this lack became more apparent as graduates, teachers, and industrial representatives were interviewed and the results of the interviews assimilated.

One hundred and fourteen graduates of the school years 1954–57 were surveyed. Returns on the interviews were obtained from one hundred of these graduates, only 14 did not respond. All interviews were of a personal nature either by phone or direct conversation with the individual or his parent.

Each student was asked a uniform series of questions and his responses tabulated. Some of the more interesting results are indicated herewith.

1. Fifty-three per cent of those interviewed entered the trade for which they were trained.
2. Sixteen per cent entered the armed forces.
3. Nineteen per cent entered a college or a college level technical institute.
4. Twelve per cent entered a trade or area not related to their training.

Further appraisal of the above groupings indicated a number of other revealing factors here listed:

1. The number of boys entering the trade for which trained did not ap-

Machine shop. Claude Wingrave, instructor

Electronics shop. Lynn Lee, instructor

pear to be, at first glance, a very high percentage, however, it compared very favorably with the results obtained by the so-called college prep curriculums in the same comprehensive high school.

2. Many of those who entered the armed forces were found to be engaged in specialities related directly to their previous training. This was especially true of those trained in the area of electronics.
3. The number of students entering college level training was remarkably high considering the fact the curriculum was listed as noncollege and many boys were led to believe that college entrance might be highly difficult if they pursued this program of studies. Many of these boys chose areas of specialization in college directly related to their training in high school trade courses.
4. The group who entered a nonrelated area were not considered as being completely improperly trained. Many factors of their former training related to their jobs. It was generally conceded, however, that a good industrial arts background would have been more suitable for this group.

Perhaps the appraisals just indicated should have led us to believe that we were doing a remarkable job and no improvement was necessary. The survey, however, confirmed a number of assumptions that had been previously expressed.

Additional factors revealed in the interviews were indicated as follows:

1. Nearly every single student who entered college level training expressed a desire for more related instruction in mathematics and science. Many were required to take make-up courses without college credit.

   This large number of college entrants from a noncollege curriculum plus a large group who probably avoided the curriculum and subsequently went to college indicated a great need for a college-prep technical curriculum.
2. All of the trade instructors expressed the opinion that many good students avoided the trade curriculum because of its noncollege label for *social* as well as academic reasons.
3. A very large number of the students who entered the trade for which they were trained expressed a desire for more related instruction in mathematics, bookkeeping, typing, etc.
4. Many of the boys who entered a nonrelated area expressed the opinion that greater breadth and less specialization in the curriculum was advisable.
5. A considerable group of all the boys interviewed indicated that they had very little guidance in the selection of their area of instruction and that it was difficult to change their area of specialization once they had chosen a curriculum.

   Boys reflected how they were enthralled with the possibility of working on a hot-rod in auto mechanics and did not choose the area because of its future potential. Many of these boys later regretted their decision and actually entered another unrelated trade upon graduation.

Taking into account all of our findings we arrived at a revision of our course offerings along these lines:

1. An increase in the breadth of the course offering was made by adding more mathematics, science, bookkeeping, typing, etc.

Auto mechanics shop, engine mechanics area. Robert Harrington, instructor

Industrial Tech. (Uni. Prep.)	Industrial Arts	Industrial Trades Prep.
10B		
English 3	English 3	English 3
Algebra 1	Mathematics 2	Mathematics 2
Home Room and Phys. Ed. 1	Home Room and Phys. Ed. 1	Home Room and Phys. Ed. 1
Ind. Arts, 5 hours	Ind. Arts, 5 hours	Ind. Arts, 5 hours
10A		
English 4	English 4	English 4
Algebra 2	World History 2	World History 2
World History 2	Home Room and Phys. Ed. 2	Home Room and Phys. Ed. 2
Health Ed.	Health Ed.	Health Ed.
Home Room and Phys. Ed. 2	Ind. Arts, 5 hours	Ind. Arts, 5 hours
Ind. Arts, 5 hours		
11B		
English	Bus. English	Business English
Am. History 1	Am. History	Am. History
Home Room	Science 1	Home Room and Phys. Ed.
Geometry 1	Home Room and Phys. Ed.	Mech. Drftg. 1 or Elem. Design (Prtg. only)
Ind. Trade and Tech., 10 hrs.	Ind. Arts, 10 hrs.	Ind. Trades & Tech., 10 hours
11A		
Am. History 2	Am. History	Am. History 2
Home Room	Science 2	Home Room
Geometry 2	Home Room	Ind. Trades and Tech., 10 hours
Ind. Trade and Tech., 10 hrs.	Ind. Arts, 10 hrs.	
12B		
Senior Composition	Senior Composition	Senior Composition
Physics 1	Home Room	Home Room
Home Room	Ind. Arts, 10 hrs.	Welding — Auto Shop Machine Shop
Ind. Trade and Tech., 10 hrs.		Ind. Trades and Tech., 10 hours
12A		
Mod. Problems		
Physics 2	Modern Problems	Modern Problems
Home Room	Home Room	Home Room
Ind. Trade and Tech. 10 hrs.	Ind. Arts, 10 hrs.	Ind. Trades and Tech., 10 hours
Suggested Electives		
Chemistry 1	Bookkeeping	Bookkeeping
Chemistry 2	Business Law	Business Law
Algebra 3	Typewriting	Typewriting
Algebra 4	Mech. Drafting 1 and 2	
Mech. Drafting 1		

2. Reduction of the number of hours spent each day in a given shop in the trades curriculum from three clock hours or periods to two clock hours or periods.
3. Provision of more of an opportunity to investigate opportunities in several industrial areas by requiring each sophomore boy registering in any one of these three curriculums provided for trade and technical training to select a minimum of two shops during his first year in senior high school.
4. The addition of an industrial technical curriculum. This curriculum was designed to meet college of engineering or Technical Institute specific entrance requirements.

Boys who desired shop experience in high school no longer are forced to bypass these classes because they object to entering a curriculum that bears the social stigma in its title (noncollege curriculum).

Parental objections to noncollege preparation curriculums are to a greater degree overcome by the addition of college prep shop course. You are familiar with the typical tradesman who wants his son to have something better than he had. He doesn't want Junior to be deprived of any opportunities in later life such as possible college entrance.

To ask a parent to admit that his son is noncollege material or even to deprive him of the opportunity to enter college is a mistake. Certainly at the age of the usual ninth grader few parents, counselors, or the pupils themselves can make accurate predictions as to whether or not the pupil will enter or complete a college education.

Three curriculums were established in all, two of which are revisions of the previous curriculums and one which is new. The three curriculums are Industrial Arts, Industrial Technical, and Industrial Trades.

To facilitate registration a guide was written for counselors, teachers, and student use. The guide included suggested programs of study, curriculum descriptions, and registration instructions. A summary of the guide follows:

Industrial Trades and Industrial Tech. Curriculum Lincoln High School

Students may select from the following areas; machine shop, electronics, woodwork, printing, and auto mechanics.

10B and 10A Registration

a) All students in the above curriculum must register each semester for the course (industrial arts, 5 hours, indicate shop). A total of 10 hours of this course is required.

b) Students registering for the course must select a different shop each semester of their sophomore year.

c) Registrations must indicate the shop preference as (industrial arts, 5 hours, machine shop).

11B, 11A, 12B, and 12A Registration

Industrial Arts Curriculum

a) All students in the industrial-arts curriculum register for the course (industrial arts, 10 hours, indicate shop). A total of 20 hours of this course is required, however, all 20 hours need not be in one shop.

b) This course is normally considered a one semester course, however, students may continue in any one shop for a total of two semesters with the instructor's approval.

c) A major of 40 hours of industrial-arts courses is required for the industrial arts curriculum.

Carpentry class constructing a building at the Nebraska State Fair Grounds. Clarence Evans, instructor

d) Registrations must indicate the shop preference as (industrial arts, 10 hours, machine shop).

Industrial Trades Curriculum

a) All students in the industrial-trade curriculum register for the course (industrial trade and tech., 10 hours, indicate shop). A total of 30 hours of this course is required, all of which must be in the same shop.

b) (Industrial trade and tech., 10 hours) is normally considered a four semester course. Students who register for this course must have instructor's prior approval.

c) A major of 40 hours of industrial-arts courses is required for the industrial-trades curriculum, 30 hours of which must be in the same shop.

d) Registrations must indicate a shop preference as (industrial trade and tech., 10 hours, machine shop).

Industrial Technical

a) All students in the industrial tech. curriculum register for the course (industrial trade and tech., 10 hours, indicate shop). A total of 30 hours of this course is required, 20 hours of which must be in the same shop.

b) This course is normally considered a four semester course. Students who register for this course must have instructor's prior approval.

c) A major of 40 hours of industrial-arts courses is required for the industrial tech. curriculum, 20 hours of which must be in the same shop.

d) Registrations should indicate a shop preference as (industrial trade and tech., 10 hours, machine shop).

Shop Hints

C. E. FORD

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1. To identify projects or parts.

I have used the following method of identifying pupil's work for a number of years, and it works well. I have my work spaces numbered (we use numbers taken from old automobile license plates), and each boy is assigned to a definite work space. The work number of each pupil is his work space number preceded by his period number. Thus, if he is in period one on bench one, his work number is eleven. If he is in period five and bench ten his work number is 510. A misplaced part carrying a number is quickly recognized both as to class and boy. The number is stamped in places on the work where it will not show when the job is complete. Since using this method, I have very little trouble with lost work or with pupils being confused as to what is theirs.

2. Loose file handles.

When a boy comes to me complaining about a loose file handle, I grin at him and tell him he is admitting that he has used his file incorrectly. File handles do not come loose by pushing on them, so he must have been dragging his file on his work. Handles fitted correctly will not come loose when the tool is used correctly; and, of course, the tool gives better service for a longer period of time.

3. Cleaning hands at the stain bench.

A piece of waste saturated in solvent and kept in a tin can or metal container on the stain bench, affords a means of cleaning finishes from hands. It also prevents waste of solvent. Keep the can covered to prevent the danger of a fire.

4. Safer and easier drilling.

A block of wood backing up metal held in a vise, makes for safer and faster drilling. It also saves drill bit breakage.

5. Clean and wax in one operation.

Fine steel wool saturated with floor wax will clean, rub down, and wax at the same time. We even use this method on our work benches. We shellac and wax the bench top once a year, and clean and wax them about four or five times a year.

6. Prevent handles from splitting.

When a friction fit must be made with wood handle to tool (as a file handle), the handle is likely to split. Fill the hole in the handle with water and allow five minutes for the wood to absorb what it will. Pour out the remaining water and drive the handle on the tool with light taps until it is firm.

7. Re-pointing soldering coppers.

When soldering coppers become pitted, or too blunt, heat them to a red hot heat, and forge new points on an anvil with a hammer. This saves the copper, and the time lost in filing.

8. To clean a paint brush.

Wash paint brushes with hot water and soap after cleaning in a solvent. Rub dry on cloth or towel paper and the bristles will not stick together.

9. Rust proofing.

Linseed oil with a bit of dryer added makes a good coating to prevent rust on such projects as the inside of sprinklers and planters.

10. Making outside enamels.

Outside enamels can be easily made by mixing a good grade outdoor varnish with color ground in oil. You can mix to whatever consistency that will serve the purpose, in just the amount needed. With various colors kept on hand, and a can of varnish available, you have a variety of enamels at your finger tips . . . cheaper, better, and most dependable.

Basic Terminology of the Printing Industry

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The following terms are often found in a journeyman's daily vocabulary and should be presented to students of printing. As in the case of our school, students often come into the print shop unaware that printing is a tremendous industry and has far-reaching impacts. One of the more important, although small, areas of printing is the proper usage of printing terminology as it is used today.

These terms are reproduced on paper and handed to each student as a written assignment sheet. Each student is responsible for finding the meaning of each word as it applies to the printing industry. Many of these terms, such as points, cylinder, plane, etc., have meanings other than those applying to the printing trade; while others, such as bodkin, line gauge, quoin, etc., are readily attached to the printing trade.

agate
ampersand
antimony
ascender
bank
bodkin
border
brayer
butt
cairn
calender
chase
copyfit
cuneiform
cylinder
dead matter
deckle
descender
dirty case
dirty distribution
dope
draw sheet
drier
drum
element
em
en
folio
font
foundry
Four Demons
galley
galley plate
gauge pin
gripper
Gutenberg
hanging indention
hieroglyphic
imposition
jobber
journeyman
justification
kerned
key
kill
leader
letterpress
letterspace
ligature
line gauge
linotype
lithography
lower-case
machine finish
make-up
make-up rule
miter
monotype
mortise
nonpariel
office style
offset
papyrus
parchment
pi
pica
pigment
plane
platen
point
points
quoin
reglet
revise
serifs
shoulder
signature
slip sheet
sorts
space in
space out
swash
stick
stone
stone proof
turtle
vellum
wood block

Conservation in Our Forests

MICHAEL DENNER
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Conservation means using our world wisely or the wise use of our national resources. The intelligent care of our forests means eliminating waste, systematic cutting of trees, careful replanting, preventing and controlling forest fires, and controlling insects that feed on trees.

We like to think of our world as a large and bountiful home. But actually the earth's area is small, compared with the number of human beings on it. For each of the more than two billion persons in the world, there is an area of only about five and a half city blocks. Four of these blocks are covered by water. Only one and a half blocks are land. Only one large corner lot is good for growing crops. About three lots of this size are covered with trees that are useful.

Whenever possible, we must replace the resources we use. A good forester cuts trees only where other trees will grow to replace those he has cut.

We must prevent the waste of our resources. When a great fire rages through a forest, it may destroy lumber for a hundred thousand homes.

We must find new resources, and new

ways of using the resources we already have. The caveman knew only a few uses for a tree. It provided fruits or nuts and supplied branches for clubs and firewood. Today we know how to get many hundreds of products from trees, including lumber, medicines, rubber, dyes, and plastics. The lumber is used for man's home, furniture, and many of his implements. Trees also equalize the flow of water in streams, and guard the soil against both wind and water erosion.

Deforestation has lessened the available supply of wood, caused excessive erosion where trees have been removed on slopes, resulted in the muddying of streams, and decreased wildlife population because its cover and food have been destroyed.

The forests of our country can be made to produce the wood our nation needs. Timber should be cut according to quotas established by qualified foresters. Replanting must be carried on thoroughly and systematically. Young trees must not be damaged in lumbering operations. Maximum use must be made of less desirable and shorter pieces of timber. The government must continue to carry on its research to prevent the damage caused by insects and other enemies of the forest.

Fire destroys almost as much timber annually as man cuts. About 90 per cent of our forest fires are caused by the carelessness of man. Most forest fires can be prevented if lumbermen clean up their logging rubbish and waste and if campers and hunters are careful about smoking and making campfires.

When the white men first came to America they found a continent rich in natural resources. Much of the land was covered with forests where wild animals lived in countless numbers. Over broad grasslands wandered great herds of buffalo. The soil was deep and fertile. Swift-running streams and deep lakes held a wealth of fish.

In their struggle to get food, clothing, and shelter the settlers chopped and burned down most of the eastern forests. As they moved westward they plowed up the grasslands to plant corn and wheat. Their growing cities dumped sewage and waste materials from factories into the lakes and streams.

But forests and grasses were needed to hold soil in place and to keep rain water from running to the sea. When they were gone, less water was stored in the ground, because the plant cover that acts as a blotter was gone. When winter snow melted many rivers had floods. In the summer with little rains, wells ran dry, and crops died in the fields. Dust storms blew topsoil away. Animals and birds that once lived in the forests and on the prairies became very scarce; some kinds of birds and animals vanished forever. Fish died in unclean waters.

At last the people began to see that their very existence depends upon using these resources wisely. They began to understand that natural resources depend on one another and that people depend on natural resources. They began to understand too that individuals have no right to destroy natural resources for their own profit. . . . the lumber company that chops down all the trees of an entire state without replanting for the future and the campers whose carelessness starts forest fires. Conservation, in fact, is the responsibility of everyone. In many cases, it must be enforced by law to prevent waste and destruction, and to preserve beauty.

Conservation pays well in making a community a more beautiful place in which to live. Wherever the land is mistreated the countryside is unattractive. Vacant lots covered with weeds and trash, and bare roadsides, and streams used as garbage dumps are ugly. Forests that are littered up or burnt are ugly also. We do not like to look at them or linger near them. The recreational value of conservation is another of its important aspects. As our cities grow more and more crowded, people need places to visit on their vacations and week ends. They need more city parks and country forest preserves, which are nice and clean, more national parks, more highways bordered by trees and flowers, and sparkling streams that are not full of mud and garbage.

Our Automated Industrial Revolution — PART III

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Control System Design

The water mill was the first automatically controlled contrivance in history. When James Watt made his first steam engine, he applied the same principle in designing the centrifugal governor for his machine in the year 1788.

As early as 1680 Denis Papin placed a heavy weight on the cover of a pan, thereby contriving one of the earlier automatic devices, known as the pressure cooker. Thus, he was also the inventor of the steam safety valve, a regulator of considerable importance, even today.

The hydraulic valve is said to have originated with Humphrey Potter, if such a man ever existed, about the year 1713.

In 1830 Andrew Ure of Glasgow, Scotland, was granted a patent for a control device which was to be known as a thermostat. Today, our automobiles are equipped with electro-magnetic-bimetal thermostats.

The automatic pilot is in relatively

common use today. It was first employed in boats to correct any off-course deviations. When the ship was in open waters the automatic pilot functioned a good deal like an engine governor. Its use has been extended to aeroplanes and even aerial missiles, which the February 27, 1957 issue of "Planes" likened to an "inner ear":

THE BRAIN

Taking a lesson from that master engineer — nature — research engineers at one of this nation's major aircraft companies have developed a tiny but powerful *brain* for use in advanced missile guidance programs.

The device, weighing little more than one ounce, duplicates the balance mechanism of the human inner ear. In fact, its designers say, the device even resembles the convolutions of the inner ear in shape.

Made of glass tubing, this new man-made brain can be made ultra-sensitive electronically to provide a report to missile guidance equipment of the slightest course deviation.

Unlike nature's mysterious method of making things work, this tiny device built by man uses an electrolytic solution to cover tungsten electrodes fused into the glass material. The electrodes are connected into an eletrical circuit and when the missile strays in the slightest from its planned course, signal voltages are transmitted to the guidance system, which, in turn, activate corrective controls.

Earlier control devices were quite inaccurate because their design was based on previous experiences with makeshift equipment not devoid of trial and error. Mathematical accuracy was not a characteristic of these devices. Today, the actions of control systems are being matched with industrial plants and their processes to give maximum control with existing equipment.

The *closed sequence* came into being when mathematical precision was made an imperative. Its function is to compensate for chance disturbances. Where the closed sequence has been effected, the error determines the controller action, which in turn, reduces errors.

Sensitivity is the term employed to denote the amount of action necessary for a given extent of error. Up to a certain point, the sensitivity of a system can be increased to secure speed and accuracy of control. Sensitivity can be increased and friction between parts reduced to a point producing a form of oscillation, called *hunting*. A thermostatically controlled home heating hot water system may become *stable* or *unstable* depending upon the sensitivity of the control system. The system can become unstable if the sensitivity of the thermostat is increased enough, or it can be made stable when the sensitivity of the control is reduced. It can also be said that the greater the sensitivity of the controller, the smaller will become the persistent error caused by a particular disturbance. In a heating system where the control is too sensitive, the system has a tendency to overshoot the desired temperature. Where this tendency is reduced by making arrangements for the thermostat to take less action when the error in temperature is diminishing, and more action when it is increasing, the process is termed *anticipation* or *prediction*. It naturally follows, that *time lag* can be reduced through anticipation, which can be the interval between the action taken by the controller and the resulting response in the house temperature. To achieve stability in a control system, it must estimate what the error will be for a relatively short time ahead. Maxwell and Routh pioneered in the calculation of anticipation through mathematical equations.

Where controls are linear, the output from every component increases progressively as its input increases. If the input is doubled, so is the output. Furthermore, if the response of the system to a pair of separate disturbances is known, we can calculate what the response would be if the two occurred simultaneously. Thus, where controls are linear, and where the amount and character of the input is known, the outcomes are generally predictable.

Where we have one kind of linearity, there are many different kinds of non-linearity. Saturation happens to be one of the commonest components. In such a situation, the output ceases to increase when the input signal to the component, reaches a certain point. An electric iron with no gradation in the corrective action constitutes another example of a non-linear component. It is also an example of an *on-off* control, lacking in every phase of accuracy in performance, because of the absence of adequacy in methods of mathematical analysis and design. The non-linear theory is a most challenging problem in automatic control. Often, the designer, if forced to employ the non-linear system has no other alternative.

The multiple-loop system results when two automatic control systems are similarly linked. Controlling both humidity and temperature in a dwelling illustrates the point. The situation is complicated when we realize that warming the air can change its humidity, while moistening the air alters its temperature.

Any semblance of trial and error has no place in modern control systems. Closed sequence now compensates for random disturbances. Sensitivity is calculated to determine the amount of action to be taken for a particular size of error. Immediate consequences of disturbances must be known, as well as the existing state of affairs, after conditions have again become steady. It naturally follows that the greater the sensitivity of the controller, the smaller will be the persistent error which is being caused by a particular disturbance. Not only is anticipation a function of control systems, but rate of change is determined after the total error has been calculated. Time lag is reduced by using anticipation. The multiple loop system now controls such devices as the gas turbine, or jet engine, to prevent undue wear on parts, if not their actual destruction.

A landmark of major consequence in automatic control was reached when motors were introduced to facilitate this process. Motors were first installed to move rudders on our earlier steamships. The back-breaking job of helmsmen was thus made much easier. Servo-motors now assist aircraft pilots in moving rudders, as well as other control surfaces. Electric servo-motors not only provide controlled power, but they act as power amplifiers and make it possible to employ minute, flypower signals. Since Joseph Farcot invented the servomotor in the year 1872, the same principle has been employed in the power-steering of automobiles, torpedoes and guided missiles.

Electronic means are now being utilized to effect controls. It is possible to transmit gauge readings to a central control room, where a process controller receives the information and determines what action should be taken. The servomotor receives these decisions and acts accordingly.

Complete Automation

The final goal of industrial control is to make factories completely automated. Individual machines must be automatic and they need to become automatically linked. Continuous functions to be performed automatically include material handling, inspection, as well as control. Sequence of machine movements, as well as the handling of equipment, must be assured.

Certain consequential discoveries have been made regarding the human being as a component part of a control system. There is a limit to his output, regardless of what the input may be. The human operator's reaction is not always proportional to the stimulus which he may receive. When there is a human component in a control system his task must be made as simple as possible. A system designed for an operator whose behavior is assuredly normal, will not work with one whose behavior is apt to be abnormal.

The human being is still involved as an integral part in the chain of control

in many systems. In any system analysis, it is imperative that we endeavor to describe his behavior mathematically. The stimulus usually received through the eye proves to be the operator's input, while his muscular reaction becomes the output. On the other hand, there can be variability in human reactions caused by such factors as fatigue, anxiety, health, and home conditions. His job must be made as simple as possible, and the system involving a human being must be so designed that the machine fits the man. The designer needs to remember that a human being's nervous system makes his reactions both non-linear and extremely complex.

The designer's ability to analyze control problems is the first requisite to the construction of functional automatic control systems. It naturally follows that every control system has its peculiar function to perform, depending upon the nature of the product to be manufactured, the type of machinery available for its production, as well as the conditions under which it is to be produced. The designer's analysis takes cognizance of such factors for which he makes due allowance in his ultimate design of any control system.

Designers of control systems have certain inescapable problems quite common to most any control situation. There is the problem of inertia, a contributing factor to instability. Deviations, known as yawing or hunting, must be confined within certain limits, in order that the oscillations will become transient, and tend to die out. Feedback can become a cause of instability, well illustrated by a microphone picking up stray sound, amplified and fed back to the speaker, until self-actuated oscillations are built up to the maximum pitch sustained by the amplifier. Lag in the response of an automatic control mechanism causes instability. Time lag often renders a system unstable when it converts negative feedback into positive feedback. Any factor that tends to bring an active system into a state of rest is said to *damp it. Damping* can promote stability, but where its effect is to delay a response, it may create a time lag, and thereby cause instability. Such are the basic problems of the control engineer.

Citizenship Responsibilities of Labor and Industry

The writer's first experience with hard times in America was in the *panic* of 1907. His father finally lost his job which had provided him an opportunity to shovel iron ore with a hand shovel for seven and one-half cents an hour, ten hours a day, sixty hours a week. Unemployment was a very real threat.

There were to be more hard times which would be known as depressions. A moderate depression was to come in the nineteen twenties, with a world shattering one in the early nineteen thirties.

A number of so-called recessions occurred in the nineteen fifties.

The Possibilities of Unemployment

Since the common denominator of depressions and recessions was unemployment, it has remained a fearful factor in the lives of many who work.

There is no stopping automation, for it is bound to expand beyond the present-day expectations of the average American citizen. It has created some unemployment problems, and it will continue to do so in the future. However, this is one of the prices we pay for progress, and like so many other problems in a democracy, unemployment, too, can be controlled to a degree, when it no longer will create prolonged fears.

In spite of any assurances to the contrary, there will always be the skeptics who will spread the fear of unemployment as automation becomes even more universal. They are so prone to revert back to past depressions, especially the one in the early nineteen thirties. It could very well be argued with some degree of conviction that automation would have added seriously to the unemployment problem in the nineteen thirties, but to make a blanket statement to the effect that automation will cause unemployment to become a chronic ailment, will not bear close scrutiny.

We are living in a different world than we knew in the early thirties. The economic, social and monetary conditions are far different today, and quite conducive to the best that automation has to offer. Our economy is a continuously expanding one, with people constantly striving for higher standards of living. The fallacy of the theory that there is only so much work to be done, and that machines will further reduce this work, is being recognized as never before. There have been times when scarcity of labor has been a serious problem, and automation came to the rescue. Actually, existing staffs with the aid of automation met the increased demands through accelerated production.

In some countries there has been resistance to automation, especially where redundant dismissals seemed necessary. "Feather-bedding" and make-work practices have been advocated. Where there were sufficient orders to keep the workers on the job, few complaints were registered against the installation of labor saving equipment.

While it is true that certain jobs disappear with the introduction and further expansion of automation, other jobs are created. The field of electronics substantiates this theory. Without electronics we could not have automation as we know it today. It has actually accelerated automation and provided new employment for a very considerable number of additional workers. What is more, electronics will continue to expand, as will other phases of automation, constantly increasing the demand for skilled workers.

Effect of Automation on Employment

Automation may appear to be depriving people of employment, but in reality, it is accomplishing that which human beings could not do anyway. The production of fission and fusion power falls into this category. The work involved can be too dangerous, too heavy, or too precise for human hands to perform. If it were not for automation, human beings could not produce certain products in the first place. Even their manufacture creates other jobs, and demands auxiliary equipment and the production of certain raw materials.

The seasonal unemployed have been with us for years, and they will continue to exist in the future. Surely we cannot blame automation for their difficulties.

Admittedly, there will be reductions in working hours, tending to spread the work to additional employees. Shorter hours of work will afford more people additional leisure time. People will demand more goods and equipment with which to enjoy their spare time. Their needs will put more people to work. There will be a greater demand for the wherewithal with which to pursue cultural activities, thereby stimulating additional employment in the future.

There is no denying the fact that machines do put men out of work; some temporarily; others, permanently. For example, computers are bound to reduce the number of office workers, even more. From 1920 to 1950 the number of office workers increased by 150 per cent, while the number of factory workers increased by 53 per cent. While clerical workers have had more employment problems than any other employees. An expansionary economy can prolong a situation, whereby the computers never quite catch up with the office work, thereby making the reduction in office workers so gradual that unemployment among such workers does not occur with critical suddenness.

There is concrete proof that the fear of technological unemployment is often exaggerated. For example, unemployment was not a serious problem in the year 1955 in spite of the fact that it was possible to produce goods with approximately two-fifths as much labor

per unit as was required in the year 1910.

Obsolete equipment can delay the process of automation, thereby putting men out of work at least temporarily. To prevent unemployment it is necessary to proceed at a steady and reasonable pace in improving the automotized process in any factory. When a manufacturer allows his plant to become antiquated, other manufacturers will modernize their factories, and undersell the less progressive producer, who is thereby forced to curtail production. Curtailed production under such circumstances, not only creates unemployment; it may become a direct cause of bankruptcy, leading to permanent unemployment, as far as that particular factory is concerned. Where lost markets result, they not only raise havoc with an industry; they disrupt the very life of a community.

Contemplated changes in production methods, especially where they are very extensive in scope, may create temporary unemployment. However, such conditions in industry were successfully met long before automation reached its present stage of perfection.

Work stoppages ensue from a number of causes; old, as well as new. Curtailment of factory operations may result from a shortage of fuel, electric power or raw materials, thereby leading to varying degrees of unemployment. A factory may have to close permanently where irreplaceable raw materials have been exhausted. Certain raw materials may eventually be controlled by a limited number of nations, causing factories in have-not countries to go out of business in areas of production, where such supplies are needed. On the other hand, synthetics have been produced by have-not nations, not only to solve the problem of materials shortages, but to provide work for people who would otherwise be unemployed.

Certain monetary difficulties can arise where the consumer, worker and the management refuse to practice wise self-restraints. Undue wage demands, profits, and dividends without consideration for all concerned, including the community, can lead to difficulties which ultimately create conditions of unemployment. Automation does not cause prolonged unemployment where the people concerned are willing to practice reasonable self-denial for the good of the business and the general welfare of the community.

Modification of consumer tastes diverts their purchasing power into additional channels. Attractive and useful products adequately advertised to prospective buyers means significent sales of the products. These demands put more people to work, thereby alleviating any unemployment which may prevail. Retooling for new products and new models naturally causes some work stoppages, but most employees take such layoffs as essential to continued employment.

Automation Is Becoming World Wide

We need to remember that automation is becoming more world wide as time goes on. Our competitors are not only increasing in number, but they are giving us a tougher *run for our money*. There is only one course open to us, and that is to stay ahead of the nations which are competing with us. Markets are not only national; they are also international in scope. Other countries are improving their industrial systems, and if we are to lead in the market places of the world, our process of automation must never stand still.

Amalgamation of industries does create redundancy, but this was true long before automation progressed, to the stage where we find it today.

To make a blanket statement to the effect that automation, as such, will cause undue unemployment is not based on sound thinking. We have had varying degrees of unemployment throughout the history of our industrial development. Automation, especially, when it is not accompanied by self-restraint and reasonable self-denial on the part of humanity, can develop into a casual factor for unemployment, but we cannot blame all of our unemployment difficulties on automation.

Harold J. Ruttenberg, former labor economist, and now an employer, writing in Harper's Magazine (December, 1955), offers these words of encouragement to prospective employees, but more especially to our youth of today:

> As I see it, depression fears are wrong. What American industry has to fear in the next decade is whether it can produce enough. The next 20 years will witness the greatest growth period in our national life. By 1975, 200 million Americans will tax our productive capacity with their needs.

In spite of the many problems created by automation, W. C. Newberg, president of the Dodge Corporation, issued this stark warning:

> The company that gives up consideration of automation because of the high cost is the company that will soon find itself outstripped by its competition.

There is much to be said on the brighter side of the employment picture, in spite of layoffs which follow immediately after newly conceived automation in our factories. For example, in the year 1957, automation machinery firms, 750 in number, did a three billion dollar business, which could not have been reached without additional workmen. While workmen are eliminated in certain areas where automation takes over, other jobs are created offering added employment to those so affected. Products are being designed and manufactured which could not be made available without automation. It is quite generally recognized that many frozen foods, a blessing to humanity, could not be produced without fast-operating automatic freezing, cooking and packaging machinery.

In a world as competitive as automation is bound to make it, there is no escaping the problem of human relationships. Man's inhumanity to man must be alleviated if there is to be any world at all. If we are successful in the process, war will be outmoded as the fruitless means, which it has always been, for settling world differences. Under-privileged nations, as well as people yet unborn throughout the world, need the quantity and the quality of the products which only automation can afford them.

> In the United States, for instance, areas of unemployment alternate with areas where there is an acute shortage of labour, so that there is in many industrial districts local overflow employment in spite of the continued existence of a relatively large number of unemployed in the country as a whole. In certain American industries there is overfull employment which tends to become accentuated whenever there is an expansion of business activity. Owing to inadequate mobility of labour, among other causes, it is not always easy for these industries to draw upon these manpower reserves, substantial as they are in theory.
>
> Paul Einzig

Overfull Employment

Even the scarcity of labour is not always a pleasant outlook for a community, for overfull employment presents certain problems too. Overfull employment obviously means that there are not enough workers to fill the existing vacancies. Where such a condition exists for any great length of time, the product can worsen in quantity, as well as quality.

When jobs are unduly plentiful poor workmanship may characterize the efforts of workers. They may not be able to withstand the prosperity resulting from the abundance of job opportunities. Where the precision and quality of the work depend on automation, this condition cannot exist. Slipshod work of the older workers is hardly an inducement for apprentices to spend their time mastering a trade.

Overfull employment can become a direct cause of low productivity. Here again, employees may become lax in their efforts because they know they can get work elsewhere, if necessary. They also know that their employers *will play*

ball with them for an interminable length of time because manpower is difficult to secure. Automation can come to the rescue of the factory owners, for its machinery sets the speed with which goods are to be produced. Quality, too, is determined by automatic machines. There are times when foremen hesitate to issue instructions to workers, to say nothing about daring to criticize them for mediocre workmanship.

Self-restraint and self-denial mark the man who can discipline himself. Whether times are good or bad, workers need to control their actions to fit the occasion. There can be a decline of industrial discipline to the point where it terminates in actions which seriously discredit the worker in the eyes of the entire community and country. Unwarranted strikes can very well become a sad reality.

Overfull employment can lead to the poorly balanced distribution of manpower. Industries capable of paying high wages can steal workers from firms which are compelled to pay less attractive wages. Even the community suffers when this occurs.

Overfull employment can very well become one of the contributing causes of an inflationary wage spiral. Employers may find themselves in a situation where customer demands must be filled, and in order to prevent work stoppages, they are compelled to make wage adjustments whether they are warranted or not. The ultimate result of such bargaining is an inflationary wage spiral which may well help in the creation of a recession.

Regardless of what the system of production is in America, employment will have its ups and downs. It is to be hoped that these fluctuations will never again become too violent. There can be no guarantee of continuous full employment. We are so apt to lay the blame for our employment difficulties upon the technological innovations which are being employed at the time. Automation, of course, is no exception, regardless of how sporadic the periods of employment may be. To insist that automation can mitigate our employment problems is to arouse the skepticism of a large number of people, in spite of the fact, that as our productive system has improved, so has the lot of our workers.

The concern of every worker is very real when it comes to the matter of employment. Such anxiety is natural, for steady employment in spite of unemployment insurance, means life for a man as he would like to live it with his family. It fact, employment is certain to be such a blessing that the average citizen can never have too much of it. While employment is a very personal matter, the worker's interest in it does not always coincide with the interest of the public.

Curiously enough, overflow employment can make workers unduly lax in the assumption of their citizenship as well as their job responsibilities. Under such circumstances it is easy to become satisfied and even apathetic. It could very well be that irresponsibility on the part of trade union members contributed to the creation of circumstances which produced a David Beck in 1957. Then there is always the gratitude that a democracy must extend to a man like Robert Riesel who lost his eyesight in fighting labor racketeers, and exposing their rackets. The indefatigable Senator John McClelland and his Committee did their work well, as they conducted their hearings.

The Trade Union

The Trade Union membership in America numbered fifteen million in 1957. Every time such an important group allows questionable activities in its ranks, it loses public prestige. The confidence of citizens outside of trade unionism as well as the members in it, is shaken. Apparently it takes a catastrophe to awaken people to their real responsibilities, especially when they are riding the high waves of prosperity with its overfull employment. Workers, like all other citizens, have obligations, as well as rights; obligations not only to their loved ones, but to their community, nation, and the world.

Trade unions as such, have one major function, which is the promotion of the welfare of workers. They are not a profit making group; their business is not to invest workers' money in real estate, to be sold back to the union with substantial personal profits. In guarding the rights of workers, union officials must always keep in mind the welfare of the whole country. They too are public officials, not immune to candid public criticism. The longer full employment continues; the more lucrative the worker's situation becomes; the more he must realize his citizenship responsibilities outside his union, as well as in it. Honesty is an absolute imperative. Trade unions constitute a tremendously powerful force in American life, and the greater the power, the greater must become the sense of responsibility in a country like America.

On one matter there is no disagreement, for everyone is in favor of a high level of employment. Automation, with its capacity to accelerate production, can be a vital factor in the prevention of overfull employment whenever it threatens stable conditions of employment.

Wood Need No Longer Be Simply Functional

ERNST H. SUERKEN
Dobbs Ferry, N. Y.

Structural lumber has come a long way since the days when, unfinished and unpainted, it served as the stereotyped frame of a building, well hidden behind exterior and interior facings. New techniques in the processing and design of wooden beams and girders have made it possible to combine their structural functions with aesthetic ones.

Some of the dramatic, flowing roof lines conceived for contemporary building have been made possible because certain types of wooden beams can be bent to the designer's specifications, thereby giving them added strength and beauty. One method of shaping beams has made it possible for architects to

venture into the design of circular buildings and T- or Y-shaped buildings, as well as parabolic and tree-shaped roofs. The structural members used for this type of construction are actually strips of wood glued together under great pressure. The compression creates a union with great tensile strength.

A variation of the open beam and plank system used in building early American trestle bridges and New England mills, this process was revived for World War II shipbuilding. More recently it has been adapted to construction where the shaped beams can be utilized to fulfill a decorative function besides the structural purpose.

This building method has been used on a large scale by Slater and Chait, architects, who have applied it to the designs of hotels, motels, churches, restaurants, beach houses, private homes, and state park buildings.

The architects feel that shaped beams have three important advantages over the conventional level members. Most important from a designer's point of view is the dramatic impact created when a structural beam — painted, varnished, or finished in some other decorative way — lends texture to an otherwise bare roof line while it also provides a ceiling pattern for the structure's interior.

Structural strength is the second advantage cited by the architects. Because the beams are wider in some places than others, the shape can be so devised as to place the greatest width at the point of greatest structural stress. In many cases this is consistent with the aesthetic consideration, because the viewer's eye demands an appearance of strength in that part of a structure where strength is needed most.

The system's third advantage results from the fact that shaped beams are fabricated and finished in a factory and prepared for relatively trouble-free installation. This cuts down construction time and costs on the site.

An example of shaped-beam construction in which roof and ceiling have been treated in combination is the Skyline Terrace Restaurant at Catskill, N. Y. It was designed by Slater and Chait, who also drew the plans for the adjoining Milroy Motel.

In the restaurant, wood planking, 2 to 4 in. thick, has been placed across shaped beams that are spaced 8 to 14 ft. apart. This combination forms a finished wood panel interior ceiling, as well as a natural roof deck. The continuous sloping roof, 64 ft. long, is, in effect, an airy-looking cantilever.

The construction method has also enhanced the interior layout of the restaurant. The use of long spans has made possible the elimination of all interior columns. This has provided a high-ceilinged dining and bar area, divided only by a massive fireplace used as a functional separator. The combined floor area of the two sections is 28 by 72 ft.

The dramatic ceiling beams and the stained wood panel interior ceiling complement the natural decor of the building and blend attractively with the site as well. Perched atop a small mountain, the inn takes full advantage of the view of the surrounding Catskill Mountains.

Safe Driving Week at Senn High School*

A. C. VASIS, JR.
Chicago Teachers College
Sabin Campus
Chicago, Ill.

The Senn Safety Club proclaimed the week of December 5 to the 12 as *Safe Driving Week*. SD-Week was set aside at that time to further emphasize to our students the need for safe driving habits during December, the most dangerous month of the year for traffic accidents in Chicago. Our program was also timely due to the fact that Wednesday, December 15, was proclaimed "SD-Day" by President Eisenhower's Committee for Traffic Safety.

*This material was presented in the school year 1954–1955.

The "sound car" was very effective in promoting safety during SD-Week

This shows students looking at an accident photo and a safety slogan. They were placed on the walls throughout the building

This day was observed throughout the nation in an attempt to have a fatal accident free day. Although there were fatal accidents, it made people think very seriously about safety, and it is hoped lives were saved through SD-Day.

This was the first time a program such as this was conducted by a Chicago high school. The various activities that took place during SD-Week attempted to encourage and promote safer drivers, along with making the student body safety-conscious. Students in high school are followers, and if driver and pedestrian safety is introduced to them properly they will realize the need for safe driving habits. Too many are following the example set by reckless speeders that take so many lives each year. If the awful results of unsafe practices are presented to them, many lives can be saved.

The Safety Club, consisting of auto shop students, worked very hard in preparation for SD-Week, and the results were very successful. Safety posters, slogans, and messages were placed throughout the building. Actual traffic signs were hung in the halls to allow students to become familiar with their shapes and warnings. Students wore hatbands with slogans printed on them. Slogans and messages were put on automobiles that were parked in the vicinity of the school. Slogans were also placed in the daily bulletin which is read during division period. The school newspaper, as well as a city newspaper, wrote stories about the Safety Club and SD-Week at Senn. Huge photos of actual accidents along with many eight-by-ten photos were placed on the walls with slogans above them.

Another project was undertaken by the club: a *sound car*. This car was driven in the vicinity of the school during the lunch periods, before school, and after school. The car was a 1931 Ford, Model A, equipped with two loud-speakers. Traffic safety messages, slogans, and announcements were broadcasted and popular music was played. The "Sound Car" proved to be of great value in arousing student enthusiasm toward traffic and pedestrian safety.

The car was rigged up for sound by two students. The mobile sound system consisted of an 80-watt amplifier with a built-in phonograph, two 25-watt speakers, a hand microphone, a d.c.–a.c. power converter, a tape recorder, and the necessary connections and line cord. The main power supply was provided by two 6-volt automobile storage batteries hooked up in parallel. One battery supplied the necessary current for the car and the other was used for the public address system. The power converter was used to convert the 6 volts d.c. to 115 volts a.c. to operate the tape recorder which in turn was connected to the loud-speaker via the amplifier.

The high point of SD-Week was the four assemblies that were presented to the entire student body and faculty. Nils A. Lofgren, director of Field Services, Citizens Traffic Safety Board, illustrated a talk with a film strip, after which a Walt Disney film, "Motor Mania," was shown. The club then put on an original skit which they had written and practiced evenings and in their free time. The club members did the narrations, acting, and made the props. This was very time-consuming for them, but they were rewarded by a job well done. The title of the play was "Safety Net," which was fashioned after the familiar television and radio program "Dragnet." The play had student appeal and proved to be very entertaining.

Insurance companies as well as safety organizations were of great value in

Photos of traffic accidents such as this one may be obtained from various organizations

— Allstate Insurance Co., Skokie, Ill.

giving and lending materials. For example, the Allstate Insurance Company gave five thousand of each of the following pamphlets to be passed out to the students during the division period: "Hi, Bike Pilots," "How Fast Can You Stop?" "Night's Deceiving Eyes," "Defensive Driving Tactics," "Killer Horses," and "Mental Menace." This meant that thirty thousand pamphlets were distributed.

A safety slogan contest was also being held at that time. Some of the slogans submitted by the students are as follows:

You may have nerve,
But don't pass on a curve!

Drive slow, not fast,
Or you'll be in the past!

Watch all the cars,
Or suffer the scars!

If while driving you're alert,
You'll go through '59 unhurt.

Don't be a heel behind the wheel!
Drive safely!

We had planned on displaying a wrecked car, but there were none available, unfortunately; it would have served as a vivid reminder. All in all, however, SD-Week was an extremely successful aid in meeting our day to day objective of making the student body and faculty more safety conscious.

Auto shop instructors in other schools might be interested in organizing safety clubs. Students as a whole are very interested in safety as shown by the fact that two years ago the writer was asked by a group of students to organize and sponsor a safety club in our school. A steering committee studied the situation and drew up the following constitution:

The Constitution of the Senn Safety Club

Preamble

We, the members of the Senn Safety Club, in order to form a more perfect organization, so ordain and establish this constitution of the Senn Safety Club. It shall be sponsored by Mr. Vasis, the auto shop instructor. The purpose of the meetings shall be to encourage and promote better and safer drivers through talks, movies, charts, and field trips. The purpose of the club shall be to educate the entire student body and make them safety conscious by driver registration, displays, assemblies, and the annual safety week. The Safety Club shall eliminate all unsafe practices taking place at Senn High School.

Article I. Officers and Powers

SECTION I: *President*. The president presides over the meeting of the club members. He appoints committees and is in charge of all matters in the club. The president has jurisdiction over any members acting in a dishonorable manner. The president has the right to call special meetings at any time.

SECTION II: *Treasurer*. The treasurer keeps accurate accounts on all money received and paid out. The treasurer gives a treasury report the last Wednesday of every month.

SECTION III: *Secretary*. The secretary keeps accurate minutes of each meeting. These minutes are to be read at the beginning of each meeting (succeeding one). The secretary is responsible for all correspondence of the club.

Article II. Voting

SECTION I: *Rules and Regulations on Voting* (*Movement of Bills*). A bill has to be passed by two thirds of present members.

SECTION II: *Impeachment*. To impeach an officer or member, the impeachment has to be ratified by three fourth of all the members.

Article III. Amendments to the Constitution

SECTION I: To amend the constitution, the bill has to be ratified by three fourth of all members.

Article IV. Restrictions of Members

SECTION I: All members must be present at meetings, Wednesday, at 3:30 p.m. in room 184, or pay a set penalty. There will be no penalty for excused absences by president.

SECTION II: All members must take an active part in the club.

SECTION III: All members must abide by this said constitution.

SECTION IV: All members must be auto shop students.

Article V. Penalties

SECTION I: If any one member is absent three times during one semester, this said member is removed from the club.

SECTION II: If any member is tardy to two meetings, it shall count as one absence.

Article VI. Dues and Entrance Fee

SECTION I: Each member must pay dues of 50 cents per semester.

Every so often the club takes field trips to different places and during the club meetings through talks, films, and charts, safe practices are studied and learned. Safety tests are taken by the club members periodically. The field trip form that is used follows:

SENN HIGH SCHOOL
5900 N. Glenwood Avenue
Chicago 40, Illinois

Date .....

To .....,
Teacher of .....
in Senn High School.

I hereby request that my son/daughter ..... be permitted to accompany the school group on an educational field trip to ..... on ..... leaving school about ..... and returning (to school)
(directly home) about .....

I understand that the group will be using public transportation (or common carrier) and will be in charge of a teacher. When returning directly the students are not to be accompanied by a teacher.

I also understand that he/she will be expected to conduct himself/herself properly, under your supervision, and I assume the responsibility for his/her conduct and safety during the trip.

.....
Signature of Parent

(Signature of parent must appear before this form is presented to class and study teachers.)

* * *

To Class and Study Teachers:

The above named student expects to be taking the educational trip indicated, and this method is used to inform you that he/she will not be in class on that day. The student is expected to make up the work on his/her own time. He/she should present an admit on the day after the trip.

Period

1. .....
2. .....
3. .....
4. .....
5. .....
6. .....
7. .....
8. .....
9. .....

Teachers are asked to initial their period to show that they have been properly notified.

Signature of Sponsor .....

Another job of the safety club is to report unsafe practices taking place around school. A safety program need not include behind-the-wheel driving to be effective. During the past two years students have become more safety-conscious, as drivers, as well as pedestrian. Safety habits are much more sportsman-like and safe. If other schools organize safety clubs and carry on safety campaigns, many young lives may be saved each year.

Industrial Arts and Vocational Education

JOHN J. METZ, Editor

AIAA CONVENTION AT LONG BEACH, CALIF.

THIS is just a reminder that the American Industrial Arts Association is about to celebrate its 21st birthday.

The convention meetings will be held at Long Beach, Calif., April 22–25.

The convention city is situated on San Pedro Bay, 22 miles south of Los Angeles and about 100 miles north of Mexico. The city is a seaport, an industrial city, and a resort town. Long Beach City College is located there, as is also a naval airbase and a drydock. Several railroad lines, air lines, and ocean-going and coastal vessels visit the port.

Industrial pursuits of the city are petroleum; gas production; aircraft manufacturing; shipbuilding, ship repairing, and maintenance; commercial fishing, fish canning; and auto assembly. Other products are soaps, vegetable oils, fish, and olives.

President Kermit A. Seefeld and his officers of the Association are doing their utmost to make the 1959 convention an outstanding event.

The opening sessions of the 1959 convention will be devoted to suggesting what industrial arts can do for the education of the exceptional student.

The question of what the industrial-arts teacher can do to understand the exceptional learner, testing programs, and working with atypical learners will also be considered.

Chris H. Groneman, C. Thomas Dean, Victor Bowers, Gardner Boyd, Ralph K. Nair, Everett Glazener, Pat Atteberry, Heber A. Sotzin, and Virgil Poling will be chairmen of several sessions that will assist industrial-arts teachers to help their exceptional learners.

Fred Baer will have charge of the work presented by master teachers. There also will be conducted tours to schools and other institutions.

The American Council of Industrial Arts Supervisors, and the American Council on Industrial Arts Teacher Education will precede the regular meetings of the convention which will open Wednesday morning, April 22, 1959.

THE 1958 STEEL CAPACITY OF OUR COUNTRY

IT IS an interesting fact that the steel capacity of the United States has been increased for 12 consecutive years. As a matter of fact it has risen at a faster rate than the population growth of our country, which is 28 per cent higher than it was on January 1, 1946.

According to "Steel Facts" published by the American Steel Institute, our present steel capacity exceeds that of Russia (the second largest steelmaking nation) by about 80 million tons. The United States can be very proud, that its iron and steel industry has again maintained its world leadership in steelmaking capacity in 1958, with a gain of nearly seven million tons — a record of 147,683,670 net tons up to January 1, 1959.

The annual increases in steel capacity since 1946 are really astonishing. The increase in million net tons in 1946 was 91.9 tons. In 1950 it jumped to 99.4 tons; in 1955, 125.8; and in 1959, 147.6.

A large part of the increase in iron and steel production in the United States during 1958 was due to the new oxygen furnaces that had been installed in several steel making plants. The annual capacity of these furnaces is now 4,033,160 tons compared with 1,081,000 net tons at the start of 1958.

Open hearth furnace capacity increased 4.2 million tons. The total open hearth capacity is equal to 126.5 million net tons per year, against 122.3 million tons a year ago. Electric furnaces had a capacity of about 13.5 million tons, against 13.3 million tons at the beginning of 1958. Bessemer steelmaking capacity declined to 3.6 million tons, against 4.0 million tons a year earlier.

Blast furnace capacity reached a record high of 94,634,850 net tons during 1958. Steel ingots and steel for castings are now made in 29 of our states, and of these Indiana showed the largest capacity growth.

PLANNING NEW PROJECTS WITH YOUR STUDENTS

WE ARE approaching the end of the school year rapidly. No doubt many of our readers are fully aware of this. But have they thought about what they want to do for the coming school year? Whenever one speaks to industrial arts teachers one hears the remark: why don't you give us more new projects?

There are quite a large number of teachers who develop their own new projects. Have you ever tried to do the same? Get your students to help. Ask the class to sketch some new projects and then help them perfect them. You may be surprised what they can produce, or what thoughts they can conjure up in your mind.

The old saying two heads are better than one works today as it did in days of yore. If two heads are better than one, what is the matter with trying how much better it would be to find out what the heads of twenty to twenty-five students working with one teacher's head can produce.

This method will help the students get a better idea of what it means to design the things they want to make. What is more the methods that they learn in planning work in this way will stand them in good stead in their later years. Try to get them interested in helping themselves by helping you.

MAKE YOUR SHOP MORE ATTRACTIVE

IT IS not too early to begin to think what you can do to make your shop more attractive to the students in the school year 1959–60. Decide first of all just what ought to be done, and then try plans on how to tackle the job of making the changes.

The first objective, of course, is to make the shop attractive by its cleanliness and orderliness. Are your tool panels, shelves for storing materials, display cabinets for exhibiting well-designed and constructed projects, bookshelves attractive and well kept, or should new ones be constructed?

This type of face lifting takes time so begin at once, and have your students help you.

SUMMER SCHOOL PREPARATION

IT IS high time for those teachers of industrial arts and vocational education who are thinking about taking summer school work to decide what institution they want to enter, what courses they want to take, and how much time they want to devote to this self-improvement project.

Preparedness in this direction is not only advisable but extremely necessary.

TWO METHODS OF TEACHING TECHNICAL AND GENERAL RELATED INDUSTRIAL-ARTS INFORMATION*

G. KENT STEWART
Eastwood Junior High School
Indianapolis, Ind.

This study was conducted by the author for the purpose of improving instruction in the industrial-arts woodworking area.

It involved a general woodworking class which met five 55-minute periods per week for 18 weeks.

Problem

The problem on which the study was based is that much technical and general related information is taught to shop classes by a series of textbook assignments followed by a question and answer period or lecture led by the instructor. This method very often does not give satisfactory results.

It seems to the writer that related information can be more easily taught by the instructor and better retained by the student if it is taught from a concrete rather than the widely used and accepted abstract and bookish point of view. It also seems that the student who solves his assignments through a concrete method will have learned more than the student who solves his assignments through the instructor's discussion or lecture.

For the purpose of this study, the class was divided randomly into two groups. The first group (hereinafter referred to as group *A*) was taught by the traditional method and the other group (hereinafter referred to as group *B*) was taught by an experimental method of teaching related information in woodworking.

The members in group *A*, the traditional group, were given the same weekly assignments as the members of group *B* with the exception that group *B* members were sent to the shop to work out the assignment with the tools and materials on hand. The members of group *A* on the other hand, remained in the classroom and participated in the lecture-discussion session led by the instructor. Both groups, however, were given ample time to read the assignment and prepare any notes they wished to before they undertook to answer questions concerning the assignment.

Each weekly assignment was followed by a single written examination covering the material presented in the assignment.[1] A weekly record was kept of the mean scores of both groups on each of these weekly examinations. At the end of each six weeks' period, the mean scores were totaled and the mean score extracted. No six week end examinations were administered. At the end of the 18-week semester the means of the six week mean scores were extracted. A final examination was then administered to both groups and their mean scores found. The mean of the six weeks mean scores and the mean of the final examination scores were then averaged and this answer was employed as the final instrument of comparison in deciding which method of teaching had produced the best group score.

Interpretation of the Results

In the final column on the last line in Table No. 1, it can be observed that the traditional group ended the course two points above the experimental group. However a close examination of the final column of figures is necessary in order to perceive exactly how the two groups compared with one another on each examination during the course of the semester.

Of the sixteen weekly examinations in which a grade was recorded, there appears to be one tie. In the fifteen remaining examinations in which the group scores were different the traditional group was ahead in eight of these and the experimental group was ahead in seven of them. Thus, it can be seen that the two groups were quite evenly matched. The fact remains however, that on some of the examinations one group showed quite a large lead over the other groups, e.g., test number twelve shows the traditional group being 22.8 points better than the experimental

***This material is repeated here because Mr. Stewart's article unfortunately was mixed up with an article by another author in the January, 1959, issue of this magazine.**

[1]Both groups were given the same examinations throughout the experiment.

TABLE NO. 1

Means of Exam Scores for Group A and B[2]

GROUP A TRADITIONAL		GROUP B EXPERIMENTAL		HIGH GROUP	
Test No. or Week No.	Mean	Test No. or Week No.	Mean	High Group	Points Better
Test No. 1	59.4	Test No. 1	62.6	Experimental	03.2
Test No. 2[3]	No Score	Test No. 2	No Score	.....	...
Test No. 3	67.0	Test No. 3	63.0	Traditional	04.0
Test No. 4	89.0	Test No. 4	91.2	Experimental	02.2
Test No. 5	85.2	Test No. 5	96.6	Experimental	11.4
Test No. 6	88.0	Test No. 6	88.0	Tie	00.0
Mean of 1st Six Weeks Scores	77.7	Mean of 1st Six Weeks Scores	80.3	Experimental	02.6
Test No. 7	93.4	Test No. 7	86.4	Traditional	07.0
Test No. 8	100.0	Test No. 8	83.4	Traditional	16.6
Test No. 9	96.0	Test No. 9	92.0	Traditional	04.0
Test No. 10	78.6	Test No. 10	81.4	Experimental	02.8
Test No. 11	95.2	Test No. 11	72.6	Traditional	19.6
Test No. 12	97.2	Test No. 12	74.4	Traditional	22.8
Mean of 2nd Six Weeks Scores	93.4	Mean of 2nd Six Weeks Scores	81.7	Traditional	11.7
Test No. 13	86.6	Test No. 13	68.0	Traditional	18.6
Test No. 14	74.4	Test No. 14	57.6	Traditional	16.8
Test No. 15	87.6	Test No. 15	92.6	Experimental	05.0
Test No. 16	96.0	Test No. 16	98.0	Experimental	02.0
Test No. 17	60.2	Test No. 17	69.8	Experimental	09.6
Test No. 18[4]	No Score	Test No. 18	No Score	.....	...
Mean of 3rd Six Weeks Scores	81.0	Mean of 3rd Six Weeks Scores	77.2	Traditional	03.8
Mean of 6 Weeks Mean Scores	84.0	Mean of 6 Weeks Mean Scores	79.7	Traditional	04.3
Mean of Final Exam	74.2	Mean of Final Exam	74.4	Experimental	00.2
Mean of Final Exam & Mean of 6 Weeks Means	79.1	Mean of Final Exam & Mean of 6 Weeks Means	77.1	Traditional	02.0

An examination of the means of the final exam and the mean six weeks scores show the traditional group *A* two points above the *experimental group B*.

[2]The letter grade distribution for the examination scores throughout the experiment was derived from the following scale: 94—100 = A, 85—93 = B, 70—84 = C, 60—69 = D, Below 60 = F.

[3] and [4]No tests were given the second and eighteenth weeks, hence, no score.

TABLE NO. 2

Weekly Lesson Titles or Topics

Week No. Test or	Lesson Title
Week No. 1	The Drawing, Plan of Procedure & Bill of Material
Week No. 2	No. Grade Recorded. Safety Test — Pass or Fail
Week No. 3	Sharpening Tools
Week No. 4	Measuring and Laying Out Stock
Week No. 5	Gluing and Clamping
Week No. 6	Sawing Across & With the Grain of Wood
Week No. 7	Assemblying & Adjusting Planes
Week No. 8	Squaring Stock
Week No. 9	Shaping a Chamfer & Bevel
Week No. 10	Assembling & Adjusting Spokeshave & Laying Out & Cutting Curves
Week No. 11	Cutting & Trimming With a Chisel
Week No. 12	Adjusting & Assembling the Scraper. Smoothing a Surface by Scraping
Week No. 13	Boring and Drilling Holes
Week No. 14	Fastening With Screws. Driving & Pulling Nails
Week No. 15	Joining
Week No. 16	Preparing for Finishing
Week No. 17	Finishing
Week No. 18	No Examination Given. Time Spent Reviewing

group while on test number five the experimental was 11.4 better than the traditional group.

The implication here, in the writer's opinion is quite evident. It is that the instructor may profit by examining his proposed lesson assignments against those which are shown in Table No. 2 and the examination score results as shown in Table No. 1 and thereby decide the best method by which to teach a particular lesson.

Implications for Further Study

Many very fine books and articles have been written on the subject of industrial-arts methods. The great majority of them, however, are based on logical thinking rather than upon experimental research. This small pilot study opens the door for further research in the field of woodworking teaching methods, not only at the industrial-arts level but at the vocational level as well.

STUDENT EVALUATION — THE NEW WAY*

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The day has passed when a teacher looked at a finished project and arbitrarily said, "It's a B," and then recorded the grade in his grade book. Measurement has been restricted largely to the teacher's estimate of a mark for the projects and to the results of a test for information. This method, although widely used, has resulted in a rather hazy idea of what the industrial-arts mark represents. Only recently have the students shared in the responsibility of evaluating their own projects even though such projects are the most concrete evidence available to support the fact that the students have mastered certain basic skills.

Few teachers will assign identical marks to the same projects consistently, largely due to the number of real and theoretical variables involved. Such things as the objectives of the course, the teacher's estimation of the student's ability, and differing ideas concerning craftsmanship influence in varying degrees the final mark assigned to a particular project. Thus, if industrial-arts teachers are to assign a project mark that is fair, accurate, and satisfactory to both the student and the teacher, it is essential that there be established some basic criteria for evaluation in line with the basic course objectives.

The project evaluation sheet is an attempt to measure the objectives of the course in terms of behavior. It is one way of determining the degree of progress of the individual student toward the stated objectives, and is presumed to be more valid on the basis that it contains both a teacher evaluation of the student and a student self-evaluation.

The items listed on the evaluation sheet are some of the normal behavior changes that will result from classroom instruction. They are a departure from the idea that measurement of factual knowledge represents a mark of achievement in the classroom. As the student evaluates his work in terms of objectives, he derives a deeper insight into the purpose of having objectives and becomes increasingly skilled in judging his worth with respect to those items.

One of the most favorable points in this method of evaluation is that it tends to lend more weight to individual comparisons as opposed to group comparisons. The student is marked as an individual upon what he has accomplished, as compared with what he is able to accomplish. This factor is particularly true in the industrial-arts classes where the project method of teaching is used extensively. The student of low ability who works steadily at his job and works to the maximum of his ability thus receives a comparable mark to the gifted student who is suffering from a lack of initiative. He has achieved a higher standing in the class than when he is graded on the factual basis, and the diligence acquired mark of the slow learner often serves to stimulate the gifted student to greater efforts.

The project evaluation sheet used in this method of marking was developed with the aid of students for the purpose of establishing some basic criteria for marking or judging the quality of the projects completed in the shop.

When a student completes a project and submits it for a mark, he fills in a project evaluation sheet. This sheet is composed of five major areas or points of emphasis. They are:

I. Knowledge, acquired and applied
II. Effort and desirable habit formation
III. Desirable attitudes
IV. Quantity of work
V. Quality of work

Each of these headings is then broken down into more detailed explanations. For example, under the heading Quality of work, we have the subheadings, *A*, accuracy as compared with ability, or how exact the student has been as compared with the accuracy of which he is capable; *B*, accuracy as compared with class average, or is the student more or less accurate than the average of the class; *C*, quality of the finished product; and *D*, project is well designed, looks good. This refers to whether the project is well designed, and whether its lines are symmetrical and pleasing to the eye.

Each of these headings is assigned a point value. The point values were selected with the objectives of the course in mind, and those functions which were thought to be of greater importance were assigned the higher values. The total points possible on the sheet are one hundred, or the score that would be assigned to a perfect project. Naturally, the majority of the projects will be scored at some place less than one hundred. The student reads

*This material is repeated here because Mr. Bennett's article unfortunately was mixed up with an article by another author in the December, 1958, issue of this magazine.

each item, assigns himself a point value, and adds up the items to find his total point score.

The second part of the evaluation is done by the instructor. He takes the student's sheet, covers up the score made out by the student, and proceeds through the items just as the student did. He assigns each item a point value. After the instructor has finished his evaluation, the two point totals are compared in terms of a point grade scale. This scale is an arbitrary number scale set up for the interpolation of the point totals into letter grades. For example, a point total of 90 to 100 points represents a mark of *A*, 80 to 89 points represents a *B*, 70 to 79 points represents a *C*, 60 to 69 points represents a *D*, and a point score below 60 represents a failing mark.

If the two point totals fall within the range of one letter grade on the scale, that mark is assigned to the project. However, if the totals fall in different grade ranges, the instructor and the student compare their evaluations in a personal conference and discuss the items about which they disagreed. In this manner, it is very likely that they can arrive at a suitable mark for the project.

It is extremely important from the very beginning to place the emphasis upon the fact that the mark will be a co-operative one, satisfactory to both the pupil and the teacher. Otherwise, the student may be led to believe that even though he has contributed his personal evaluation of the work, the teacher's evaluation is the final one which determines the project mark.

The results obtained from the project evaluation sheet method of project marking are very interesting and conclusive. This plan has been used on a trial basis in one of our industrial-arts shops for a period of more than a year. During that time, 10 per cent of the projects marked received an *A*, 28 per cent received a *B*, 49 per cent received a mark of *C*, 11 per cent received a mark of *D*, and 2 per cent received failing marks.

In 78 per cent of the cases the student evaluation and the instructor evaluation fell within the same mark range. Fourteen per cent had a difference of one mark range, and 8 per cent varied by two mark ranges. None of the cases varied by more than two mark ranges.

There was a tendency for the pupils who received the below average marks to overrate their work. However, this factor could have been the result of either an invalid self-evaluation or a misunderstanding of some of the terms on the evaluation sheet. It was found that generally, all students are able to produce a valid self-evaluation if they are given the opportunity and the incentive.

PROJECT EVALUATION SHEET

Name of Student _____ **Project** _____

	Possible	Student	Teacher
I. Knowledge, acquired and applied			
A. Neat, accurate plan sheet	4		
B. Ability to use acquired information	3		
C. Ability to follow instructions	3		
D. Ability to use working drawings	3		
E. Discusses problems intelligently	3		
II. Effort and desirable habit formation			
A. Perseverance, finishes projects started	5		
B. Ability to work "on his own"	5		
C. Dependability	4		
D. Industrious, does not waste time	4		
E. Attendance	2		
F. Uses good English in speaking and writing	3		
G. Dressed for shopwork, clean apron	2		
III. Desirable attitudes			
A. Co-operation with students and teacher	2		
B. Attitude toward work	4		
C. Uses equipment properly	5		
D. Good behavior, obeys rules	4		
E. Observes safety precautions	4		
F. Does not waste materials	4		
IV. Quality of work			
A. Accuracy as compared with ability	6		
B. Accuracy as compared with class average	3		
C. Quality of the finished product	5		
D. Project is well designed, looks good	4		
V. Quality of work, miscellaneous factors			
A. Accomplishment as to ability	6		
B. Accomplishment as to class average	3		
C. Personnel duties	4		
D. Extra work for service of shop	2		
Totals	——	——	——

Point-Grade Scale

90 — 100 points — A
80 — 89 points — B
70 — 79 points — C
60 — 69 points — D
Below 60 points — E

Problems and Projects

CYPRESS KNEES

JAMES A. WALKER
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Flint, Mich.

Every teacher may discover, accidentally or through study, materials that will prove to be rich as potential art or craft mediums. Of this variety of materials one of the most interesting is the cypress knee. The cypress trees are the most ancient of trees, around whose bases gnome-like grow the cypress knees.

In cypress country one feels that he is in another world, a world of mystery. Their feathery foliage is high above, their gray-green trunks flare widely at their bases, and surrounding the bases one finds the smooth conical cypress knees. These thrust themselves perpendicularly above the surface like gigantic reddish-brown fingers pointing toward the sky.

The adventure and struggle to get this rugged native material begins in the cypress swamp. At certain times of dryness their availability is easy. They may be found in all the southern states. Some cypress trees grow in Delaware, Indiana, Illinois, Pennsylvania, and Maryland. It is safe to say that the cutting of cypress knees does not harm the tree. An ax is a wonderful tool in the hands of a person who can handle it, but some people would prefer sawing the knees to begin with rather than cutting them with an ax and later having to employ a saw.

After discovering, selecting, and sawing the cypress knees desired, one must steam or give them a boiling hot bath for approximately five hours in order to remove the bark easily. The boiling or steaming should be done as soon as possible after sawing or cutting. The reddish-brown bark should be peeled off immediately after boiling. This is done by hand. The most important thing to remember is that the drying or curing process must be slow. It

should not be hurried by artificial heat. The wood has much individuality, the irregularities of its grain being full of decorative beauty. Exposure to the direct rays of the sun, or an ultra-violet bulb, darkens and colors the wood so that it appears to have a deep bronze sun tan.

The use of cypress knees in the high school shop or art class is probably one of the most unusual of school crafts. Shop classes make lamps and other items from these gnarled and fascinating pieces of solid wood which have been found in the cypress swamps nearby. Art classes turn the knees into interesting pieces of sculpture.

The sizes of cypress knees vary considerably, but many are quite straight and statuesque. It is impossible to find any two exactly alike. Others, probably because of injury, are bent and gnarled. Some people would choose these latter protuberances, giving full range to their imagination; however the more statuesque cypress knees make interesting table lamps, which are neither hand-made nor machine-made. The larger knees often become floor lamps. What an odd material! No design has to be worked out and no tools, including machinery, will be needed to shape the material for lamps. Cypress knees are shapes or forms that come ready made and well designed by nature. Each is a unique creation of startling beauty, and rarely does one have the desire to alter this form to make a lamp.

For table lamps, a ⅜-in. regular ship auger bit can be used to drill holes for the electrical fittings. For the extra-long cypress knees, start the drilling from the top of the knee. The electrical fittings are then installed.

A collection of cypress knees may well be the introduction to the understanding of sculpture and form. Many of these pieces can be used as sculpture in the home or garden. Carvings may be done in cypress wood. There are always pupils who enjoy whittling and who like to fashion figures, busts, and animals from a different medium. The size and shape of the knee may suggest a subject. They create a world of fantasy. In imagination each one represents an animal, a person, an object; a child would find nursery characters among them. Among some of the other uses for cypress knees are book ends, flower holders, candle holders, birdhouses, carved pins or brooches.

Carved out of a cypress knee
— Schweikhard Studio

Sawing off cypress knees in a swamp

Steel wool brings out the velvety appearance of the wood. Finishing a cypress knee can be done by preparing the surface with steel wool, then applying shellac, clear varnish, or linseed oil. Plain hard wax may be applied on any of the above finishes. The cypress knees may be stained, although that is by no means necessary. The stain, if used, should be sealed with a wash coat of shellac.

Fine arts and industrial arts teachers in many states are realizing the possibilities of cypress knees. We need to use more materials that are available in the student's immediate environment. Cypress knees today have proved to be an interesting material, an inexpensive hobby for many individuals, and a livelihood for many others.

Heating the cypress knees, and (at right) a cypress knee converted into an electric lamp

Removing the bark

A $5 FOUNDRY AREA FOR THE GENERAL SHOP

DARRELL SPENCER

Josephus Daniels Junior High School

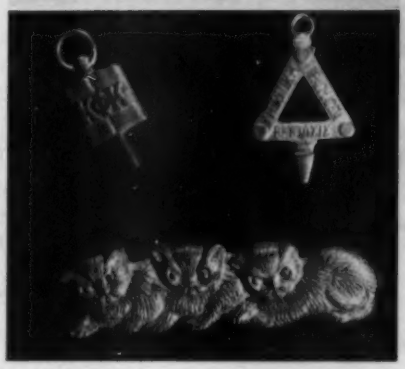
Raleigh, N. C.

Every shop has the money and space for a pumice stone glycerine foundry area. For about $5 and 16 sq. ft. of floor space you can teach almost as much understanding as in a conventional foundry area requiring 60 sq. ft., and costing $500. While most educators consider eighth graders of minimum age for a conventional foundry, the pumice stone foundry with supervision is safe for sixth graders. Motivation is no problem either. Students will find an unbelievable number of *odds and ends* to reproduce.

The necessary items, as can be seen in the illustration, are extremly simple. A galvanized sheet-metal box about 5 by 8 by 18 in., will answer very well as a container. The cope and drag pictured is made of a short piece of 4-in. pipe. Molding boards can be made of ¼-in. plywood. Sprue pins and rammers can be turned from maple. A gate cutter and finishing tools can be devised from scrap metal. Screen wire will substitute as a sieve if funds are very limited; if funds are available, fifty cents will buy a good sieve and about 60 cents will buy a 3-in. ladle for pouring the molten metal.

Ten pounds of grade FF pumice stone and an 8-oz. bottle of glycerine will complete the foundry. The pumice stone will cost about $1.20 and the glycerine will cost about $1. Add the glycerine to the pumice stone and mix thoroughly.

Patterns can be whittled from wood, but dozens of items can be found around the home, shop, or dime store. The school print shop or a commercial print shop is a convenient place to get damaged type.



Necessary items in the foundry area are simple

The alloy used for type metal is composed of antimony, copper, tin, and lead. It can be melted over a Bunsen burner in the 3-in. ladle.

Pumice stone has many advantages over sand for casting. The cohesion of pumice stone is too great to allow it to fall from the cope or drag when handled by young, unco-ordinated hands. The pumice stone does not burn and the glycerine does not evaporate when in contact with the molten metal. The grain of the pumice stone lies close and produces a smooth surface on the casting.

The procedure for ramming up the mold is similar to that of sand molds. Quite often better results can be obtained by dumping the pattern out than by trying to lift it out. Further instructions would be a waste of ink. Why not try it yourself!

CAR TOP CARRIER

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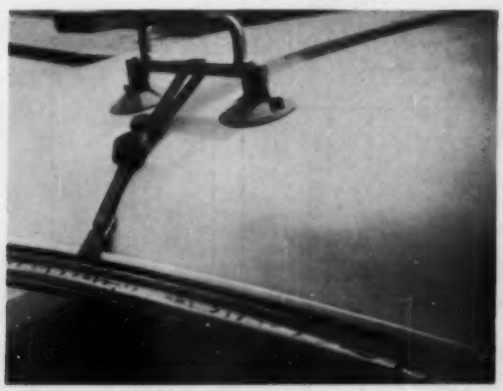
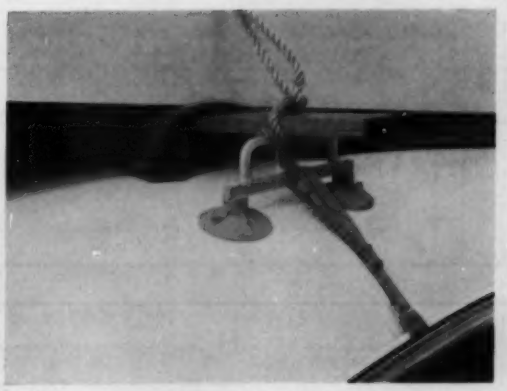
Present-day living places quite a burden upon the family car in terms of adaptability to a variety of needs. The car top carrier presented herein provides an excellent solution to many of these demanding situations. Whether it be carrying the boat to the shore, camping equipment, materials for the home repair job or bringing home the *big game*, this rack seems to be very adequate. In addition to the functionality of this carrier, its construction also provides the student with a number of valuable experiences and operations in the metal and woodworking areas.

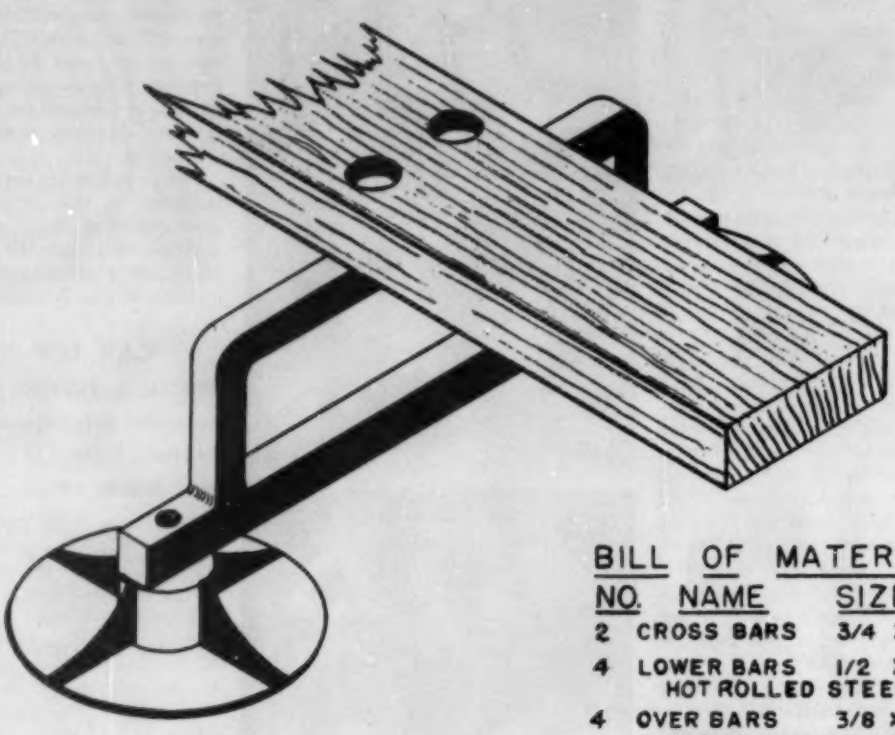
The materials utilized in this project are commonly available in the majority of school shops. The writer, however, found it to be advisable to purchase the suction





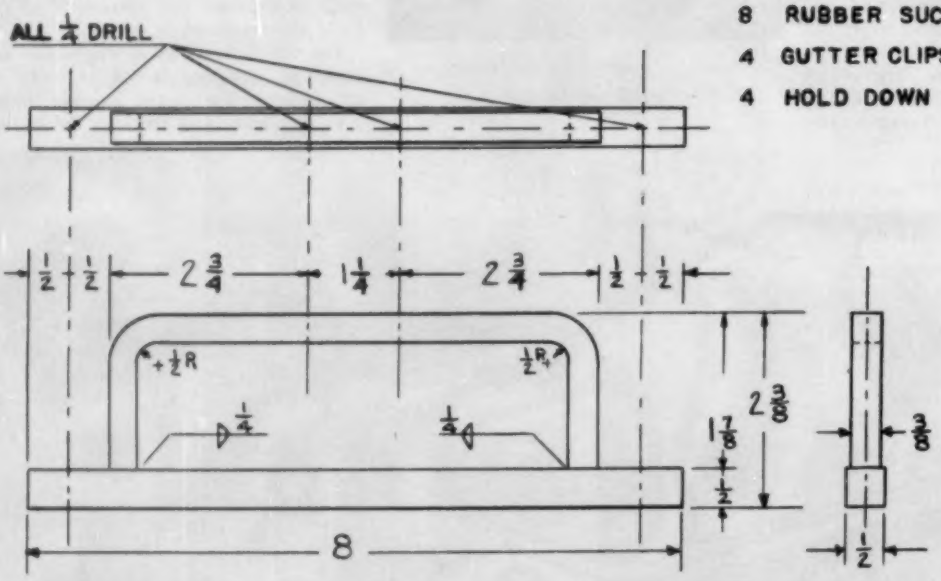
Car top carrier in use. In this instance a 14-ft. sailboat is secured to the carrier. (Right) The car top carrier is held fast to roof with rubber suction cups, hold-down straps and rubber covered gutter clips

CAR TOP CARRIER



BILL OF MATERIALS

NO.	NAME	SIZE
2	CROSS BARS	3/4 X 2 X 56 IN
4	LOWER BARS HOT ROLLED STEEL	1/2 X 1/2 X 8 IN
4	OVER BARS HOT ROLLED STEEL	3/8 X 3/8 X 8 1/4
8	STOVE BOLTS(RH)	1/4 D X 1 1/4
8	RUBBER SUCTION CUPS	
4	GUTTER CLIPS, RUBBER COVERED	
4	HOLD DOWN STRAPS	



Details of the car top carrier, and the bill of materials needed

cups, straps, and gutter clips. Many of the large mail order houses (Sears and Roebuck Co.) stock these items.

Construction Procedure

1. Cut metal to length. NOTE: hot rolled (mild steel) was employed throughout.
2. Drill required holes.
3. Bend *over bar* to required specifications. NOTE: a bending machine, bending jig, or bench vise may be employed for this purpose.
4. Prepare the stock for welding and weld as indicated. Electric arc welding was employed for this particular carrier; however, other forms of fabrication are also suitable.
5. Determine the cross bar length by measuring the roof width of the car for which the rack is being constructed. It is sometimes desirable to have the cross bars extend beyond the brackets in order to accommodate special items.
6. Prepare the cross bars. A strong and rugged wood, such as oak, is recommended. Drill and counter-bore the holes to receive the cross bar fasteners.
7. Clean, prime, and finish paint the brackets.
8. Apply a wood sealer to the cross bars.
9. Assemble the brackets and cross bars; attach the suction cups, hold down straps and gutter clips to the brackets.
10. Construction of the car top carrier is now complete.

Securing the Carrier to the Car Roof

1. Position the carrier on the car roof and apply some pressure to seat the suction cups.
2. With the gutter clips in position, tighten the hold down straps on opposite sides of the same rack simultaneously.
3. The car top carrier is now ready for use.

The car top carrier presented in the accompanying photographs has served the writer extremely well and it is anticipated that yours will be just as useful and dependable.

Indoor brick walls are popular now. To help prevent stains, the brick should be given a thinned coat of pure, white shellac. — *Shellac Information Bureau.*

CARING FOR FINISHING BRUSHES

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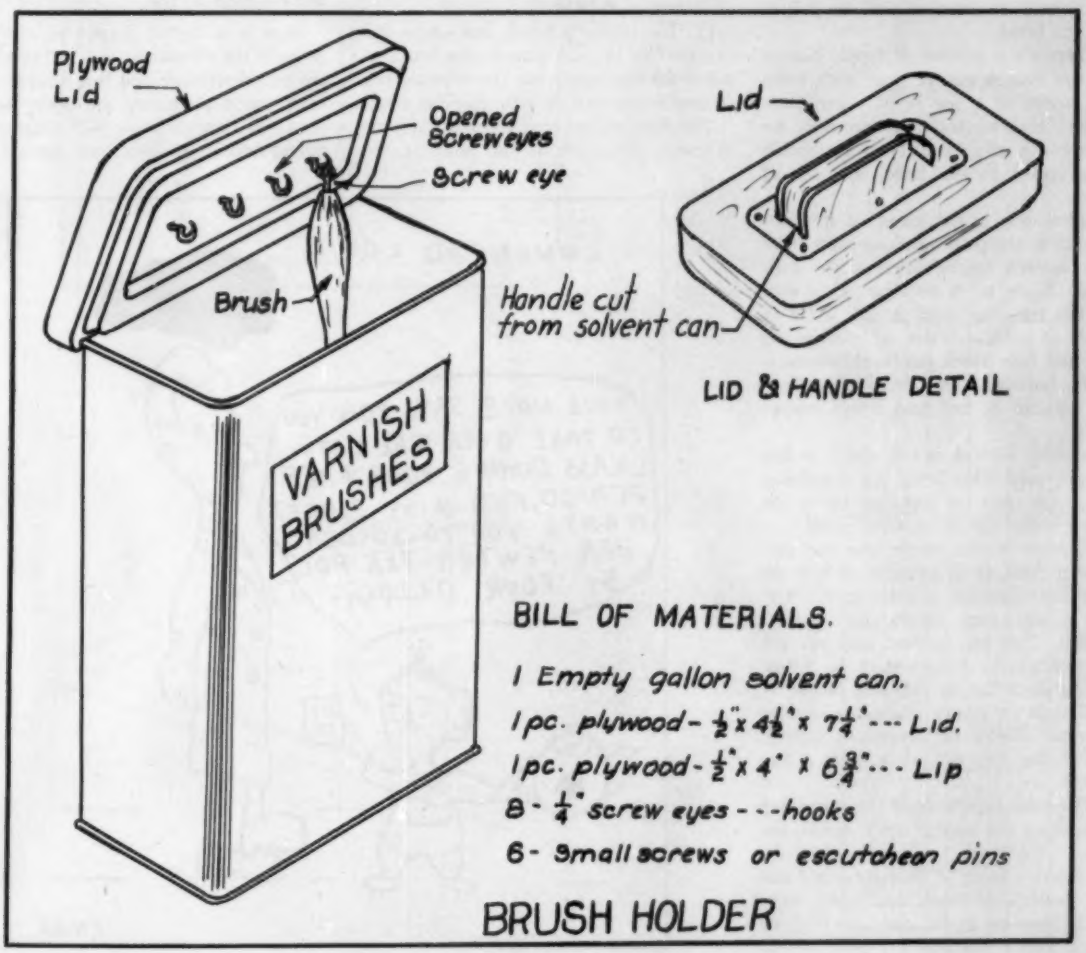
One of the many important aspects in the efficient operation of an industrial arts program is the proper handling of finishing brushes. There are a number of methods which may be employed in the storing of these relatively costly items of shop equipment. Brushes which are used infrequently should always be cleaned thoroughly in their proper solvent, dried thoroughly, wrapped and stored in the supply cabinet. It is a wise act for the teacher to retain the paper in which the new brushes were wrapped for just this purpose.

When brushes are used continually, such as the average day to day situations found in most finishing areas, it involves still another method of treatment and handling. The most common procedure is to suspend the brush in its proper solvent. One should


Plywood Lid
Opened Screweyes
Screw eye
Brush
VARNISH BRUSHES
Lid
Handle cut from solvent can
LID & HANDLE DETAIL
BILL OF MATERIALS.
1 Empty gallon solvent can.
1 pc. plywood - ½" x 4½" x 7¼" --- Lid.
1 pc. plywood - ½" x 4" x 6¾" --- Lip
8 - ¼" screw eyes - - - hooks
6 - Small screws or escutcheon pins
BRUSH HOLDER

Brush holder

never stand brushes on their bristles on the bottom of a container. In the suspension method, there are a number of ways which will serve very satisfactorily the function of keeping brushes clean, soft, and usable. One should make sure that the container in which the brushes are suspended is of ample size in volume to hold an adequate amount of solvent. Normally the size will range from a two-quart to a four-quart size. The smaller container will suffice for smaller brushes and a smaller number of brushes.

Following are some common examples of the suspension method.

1. Perhaps the simplest method is to drill a small hole in the handle of the brush at a height which will hold the bristles not less than ¼ in. from the bottom of the container. The brush can then be suspended by inserting a wire, which is long enough to span the top of the container, through the hole in the brush handle.

2. A second idea which is used by many individuals is that of attaching a hook constructed of wire or thin-gauge metal to the handle and hooking the brush on the side of the container. One disadvantage is that the hook tends to interfere with the proper use of the brush.

3. There are a number of supply houses which can furnish rubber caps, with holes in the center, of a size to fit a one-quart fruit jar. This method can accommodate but one brush which may be objectionable in a program having large numbers of students.

4. Some areas of the industrial-arts program such as the patternmaking shop make use of colored finish materials. In such cases small jars of ¼ to 1 pint sizes with metal lids are often used. A hole is cut in the lids of sufficient size to receive the handle and into which the brush handle is securely fastened. This provides an air-tight container as well as a brush storage method.

5. A third method is one which is less commonly used. That being, the suspension of the brush from the container lid by the use of a screw eye and a screw hook.

The author wishes to use this last suspension method as an example of how the teacher can make use of those empty one-gallon solvent cans which are so often discarded. They can become very efficient brush containers. A procedure to follow would be somewhat as indicated below.

1. Choose an empty one-gallon can of the shellac, alcohol, or linseed oil variety.

2. Cut the top out of it with a can opener.

3. Trim the handle from the metal top leaving about one inch of metal around the handle.

4. Select a piece of ½-in. plywood and cut it about ⅛-in longer and ½-in. wider than the opening in the can top. (4⅛ by 7¼ in.) This is the lid.

5. Then cut a similar piece of plywood about ⅛ in. shorter and ⅛ in. narrower than the opening on the can top. (4 by 6¾ in.) This will be the lip.

6. Scribe a line around the inside of the *lip* piece and cut the center out.

7. Attach this piece to the bottom of the piece as described in step 4. Use glue and brads.

8. Attach the handle, as described in step 3, to the top surface of the lid with small screws or escutcheon pins.

9. Fasten to the underside of the top a number of screw hooks according to the number of brushes which are to be suspended in the container.

10. Select the brushes which are to be used and cut the end of the handle off so that the length of the brush plus the screw eye, which is screwed into the end, is at least ½ in. less than the depth of the container.

11. The next step is to clean the container on the outside and paint or enamel according to your color scheme. This also includes the lid.

12. The container is the next identified according to its intended use by labeling either directly on the can or by the use of an attached label.

13. To remove a brush, one needs only to raise the lid and unhook the brush selected for use. After use, the reversed procedure is followed in returning the brush.

The shop teacher may construct as many of these containers as the finishing area requires. Such a container may also serve as a class project which can be very instructive from the standpoint of basic learning units and the satisfaction of some fundamental objectives of the industrial-arts program. These containers also will have a lid which will preserve the brushes and prevent the evaporation of most of the solvent from the container. Lacquer and shellac solvents are more volatile than turpentine or linseed oil. This could eliminate the cleaning of brushes after every use.

So why throw away those empty solvent cans, put them to constructive use. As the cans get smeared from long periods of use they can be discarded and replaced with new cans each semester or each year. The lids need not be remade but can be used over again. The replacement of new brushes is a simple process and involves no undue work on the part of the teacher.

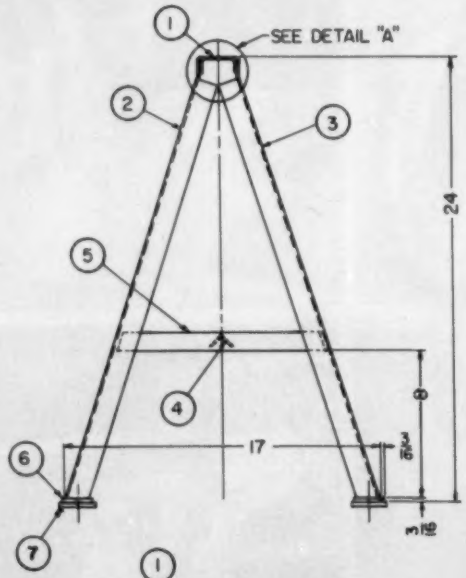
METAL SAWHORSE

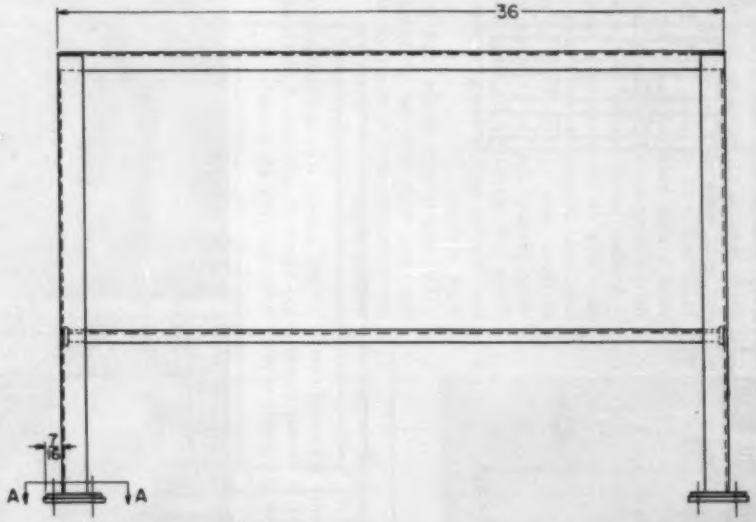
FRANK MALLOZZI
Alfred I. duPont School District
Springer Jr. High School
Wilmington 3, Del.

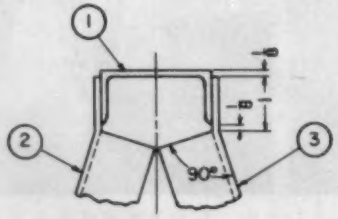
Here is a useful project in any shop. Some of the advantages of metal saw horses are added strength and less weight. Moreover, metal sawhorses are easier to construct as they do away with cutting compound angles. All joints are arc-welded.

LUNKHEAD LOUIE
THIS NOTE SAYS FOR YOU TO TAKE OVER THE LATIN CLASS DURING YOUR FREE PERIOD, AND MISS FIDGET WANTS YOU TO SOLDER HER PEWTER TEA POT BY FOUR O'CLOCK.
ENOS

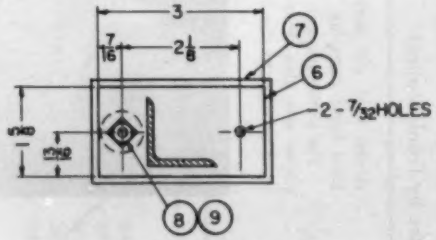
— Louis J. Enos, Lincoln Junior High School, Sacramento, Calif.



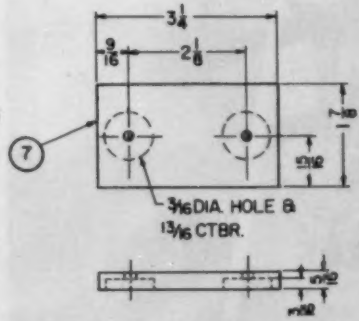




DETAIL "A"



SECTION "A-A"



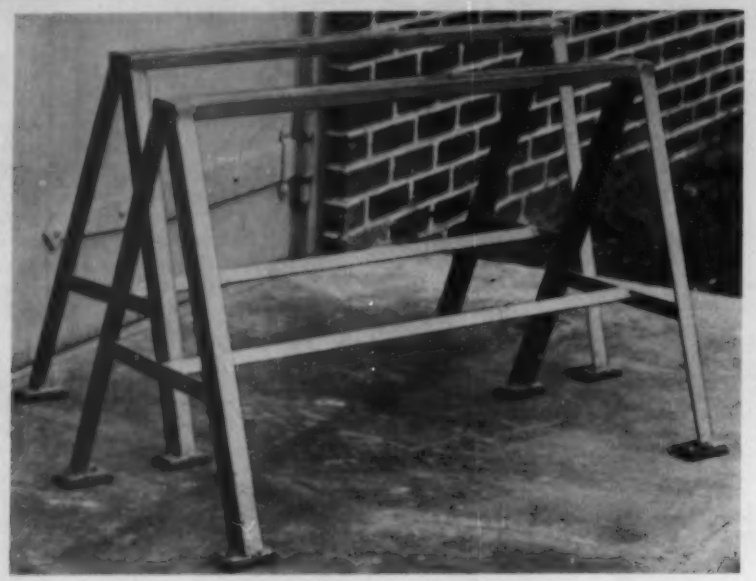
PC. NO	NO. REQ'D	DESCRIPTION	MAT'L	REMARKS
9	8	5/16 SQUARE NUTS	STEEL	
8	8	ELEVATOR BOLTS 5/16 x 5/8 LG	STEEL	LARGE HEAD
7	4	RUBBER PAD 5/16 x 1 1/8 x 3 1/4	RUBBER	
6	4	FLAT 3/16 x 1 5/8 x 3	STEEL	
5	2	FLAT 1/4 x 1 x 11 1/4	STEEL	
4	1	ANGLE 1 x 1 x 1/8 x 35 1/4	STEEL	
3	2	ANGLE 1 1/4 x 1 1/4 x 1/8 x 25 1/2	STEEL	OPP HAND
2	2	ANGLE 1 1/4 x 1 1/4 x 1/8 x 25 1/2	STEEL	AS SHOWN
1	1	CHANNEL 2" x 1" x 1/16" x 36"	STEEL	

NOTE
1/8" WELD AT ALL JOINTS.

METAL SAW HORSE

DRAWN BY | DATE | SCALE

Detail drawing of the metal sawhorse, and the bill of materials



Metal sawhorses by Frank Mallozzi

NEW DESIGN FOR FOUNDRY BENCH

EDWARD SAKS
Foundry Practice Instructor
Dobbins Vocational High School
Philadelphia, Pa.

When the School District of Philadelphia built a new foundry as an annex to the Murrell Dobbins Vocational Technical School, it was decided to design a new and improved molding bench to place in the new quarters.

Formerly, the foundry had been located in the main building where, due to its particular location near the freight elevator and receiving platform, the shop area proved to be inadequate.

Space limitation forced placing of student work stations too close together resulting in the evils of loose sand landing in each other's molds and the nipping of fingers because of insufficient bench room to maneuver heavy copes and drags.

Now, with a splendid new building that afforded adequate space it was possible to design a new and more functional molding bench.

Since the course includes jobbing molding, emphasizing basic hand skills and is taught in two shifts of three hours each per day, a very sturdy, usable unit was necessary.

Sand, as a working medium, is so flowable that it will pile on any flat part of a bench that will support it presenting a disorderly appearance. The "A" frame supports for the flask eliminate the pyramiding of sand. Excess sand falls to the floor. Note, too, that the bracing is of a design that will withstand the impact of hard hand ramming.

The grid-work side bench for rolled over copes was also designed to permit excess sand to drop to the floor. It consists of an aluminum casting that is dropped into an angle iron frame that is an integral part of the bench. Note that the side bracing is so designed that the student is allowed free play for his shovel during working time and that there is no obstruction for the broom at cleanup time.

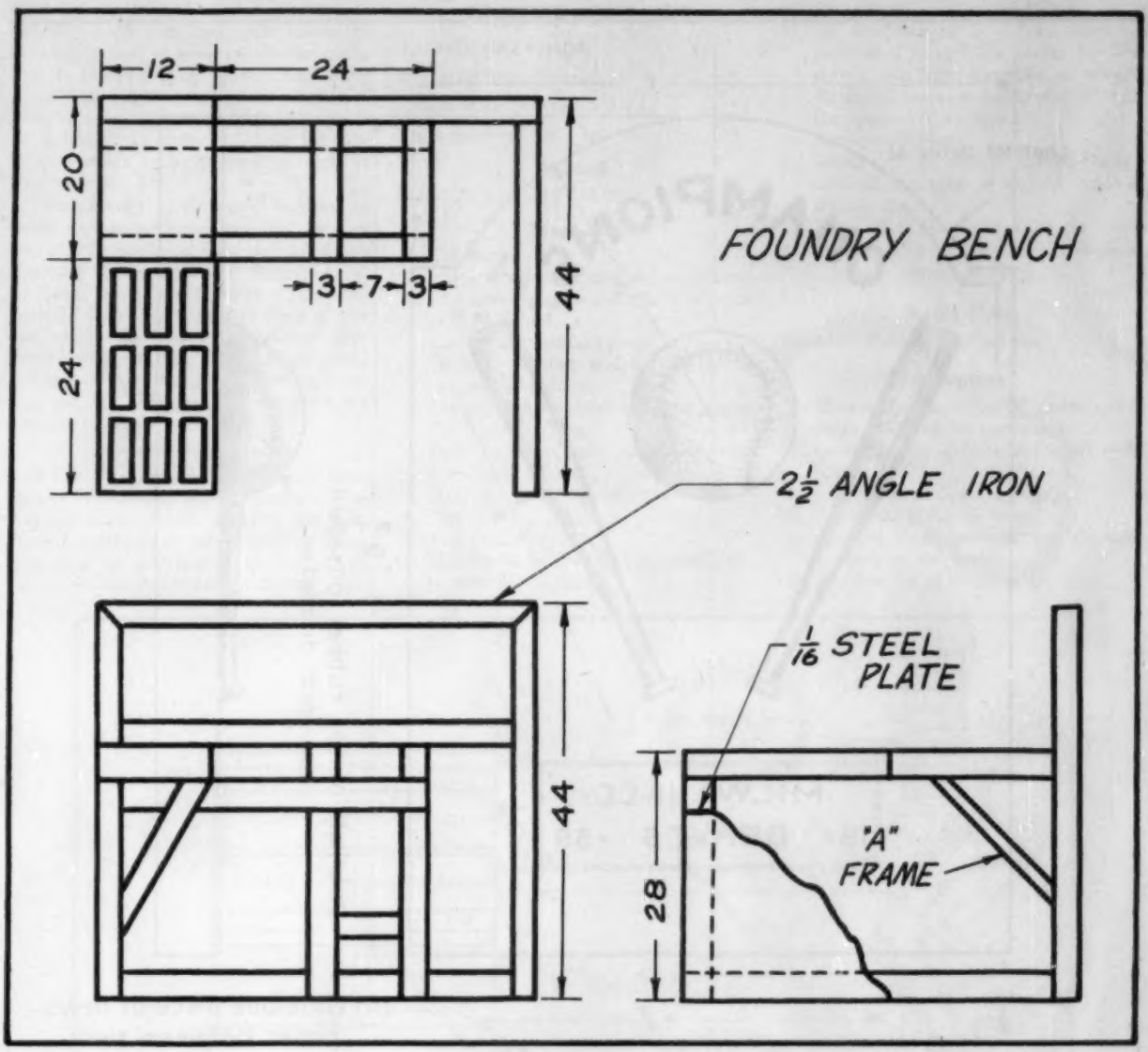
The parallel 3-in. channel-iron supports for the flask are placed so that they can accommodate the battens of a board for a 9 by 12-in. flask that is used for 9th grade boys; a 12 by 14-in. flask which is the most used size; as well as a 12 by 16-in. and a 12 by 18-in. flask. This provides a wide range of flask sizes without necessitating any adaptations to the bench.

Another useful feature of the bench is its ability to be moved as a unit where conditions demand. It can be built in units of three, four, or five. Units of five are being planned for the Dobbins foundry. There will ultimately be three banks of five benches each, totaling fifteen bench-work stations.

The step-by-step design and construction was done with the co-operation of the instructors and students of Dobbins welding shops.

One person dies accidentally on the job every 37 minutes. A work injury is suffered every 16 seconds.

Students working at the foundry bench



Details of new foundry bench

INTRAMURAL BASEBALL TROPHY

JOS. J. LUKOWITZ
Milwaukee, Wis.

There comes a time in the school year when the playing of baseball is resumed on all elementary school playgrounds. At the beginning of the season teams are organized, playing positions assigned, team names selected, playing schedules arranged, and diamonds delineated. One thing however is often lacking. No tangible recognition of the championship team is made at the end of the season.

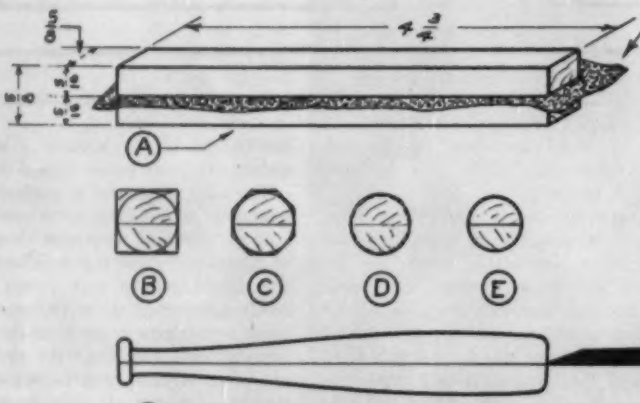
Practically all elementary schools are organized for intramural baseball. It has been found that when trophies are exhibited at about the time the baseball season begins that competition becomes even more spirited.

The construction of the trophy illustrated can be delegated to a pupil capable of making a presentable trophy or the shop teacher can in a short time make one. When the shop teacher shows his interest and contributes to the play interest of his pupils in this way he will enjoy the benefits of that intangible and highly desirable good will of pupils which will help eliminate or mitigate certain problems inherent in class management.

If a lathe is available the construction of the bat will of course be simplified. If a lathe is used be sure to add about three inches to the length for lathe cutoff. A demonstration of the method shown in making the bat by hand is a worthwhile addition to your lesson plans.

The name plate may be made of brass or enameled tin cut from a tin can. If tin is used an effect of additional thickness can be attained by cutting a little less than one eighth inch off each corner and then gently hammering all of the edges over to about a 45-degree angle. Hold the tin about one sixteenth inch over the sharp corner of a piece of wood or metal while hammering the edge over. If light gauge brass is used the effect will be enhanced if the edges are treated in the same manner. The "engraving" can be lettered with India ink and lightly brushed over with lacquer to protect it. Letter with name of team or name of school to suit conditions.

Another interesting effect can be at-



(A) Glue one piece of newspaper between two pieces of wood.
(B) Cut wood to required size and draw 5/8 circle on each end.
(C) Plane to octagonal shape.
(D) Plane the eight corners to make sixteen sides.
(E) Continue planing corners until approximately round. Shape bat with knife and file.
(F) Separate the two halves by inserting knife or chisel in joint and prying apart.

Details of baseball trophy by Jos. J. Lukowitz

tained if one half of a bat is placed horizontally about one half inch below the baseball instead of using two halves of the bat as shown by the illustration. Many schools have junior and senior teams and thus by using the bat in this way it would be necessary to make only one bat, one half of which could be used on each of two trophies.

The ingenuity of the reader will suggest many variations. Remember that the trophy may be used year after year by merely changing the name plate as required.

This trophy is sure to make a "safe hit" with the boys. The important thing is, give the pupils the healthy recognition they crave, encourage them for the benefits they will derive from this great American sport, and last, but not least, you will enjoy the benefits of pupils' good will.

A model train table can be made from panels of plywood hinged together. The top and edges should be given two thin, fresh coats of pure, white shellac. Allow first coat to dry before second is put on. — *Shellac Information Bureau.*

TOOLMAKER'S SET

ALFRED GRAYSHON
Machine Shop Instructor
Olney High School
Philadelphia, Pa.

V-Block

Material: 1 pc. MS 2¼ by 2¼ by 2½ in.

Procedure

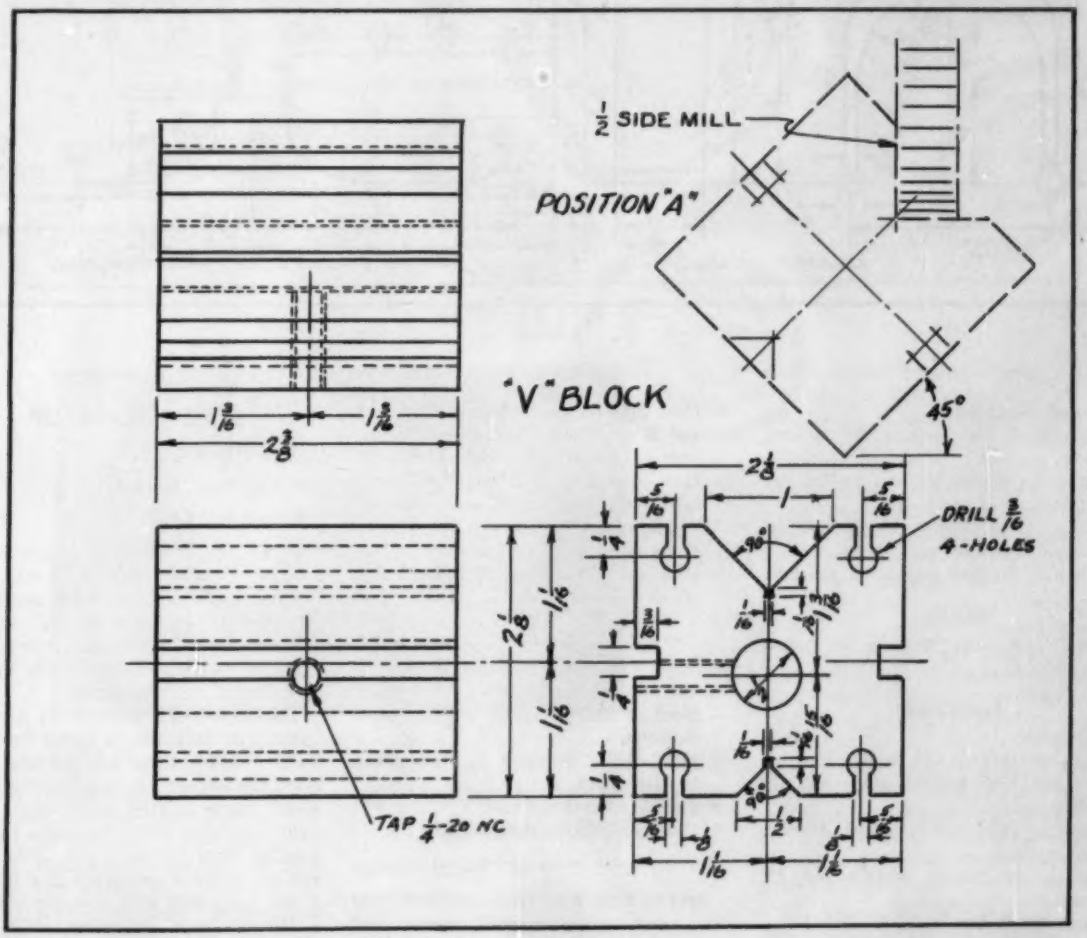
1. Cut stock.
2. Shape to size, checking for squareness.
3. Coat two opposite ends with coloring or layout fluid.
4. Lay out with surface gauge, square and scribe for drilling and slotting on the two coated surfaces.
5. Centerpunch for holes and prick punch the layout for slots.
6. Drill the 3/16 in. holes halfway through from each side.
7. Drill the ½-in. hole through.
8. Tap drill for the ¼ in.–20 tap.
9. Tap ¼ in.–20.
10. Mill the 1/16-in. slots with a slitting saw, to each 3/16 in. hole.
11. Mill the ¼ in. slots, to layout.
12. Set the block up at 45° as shown in position *A* to mill one of the 90° V's with a side mill, according to layout.
13. Reset the block in similar way to mill the opposite V to layout.
14. Remove all burrs.
15. Replace in the vise to cut the 1/16 in. slots at the apex of each V with a slitting saw.
16. Dress off all burrs with a fine file.
17. Surface grind all four sides, if there is a surface grinder available.

Angle Plate

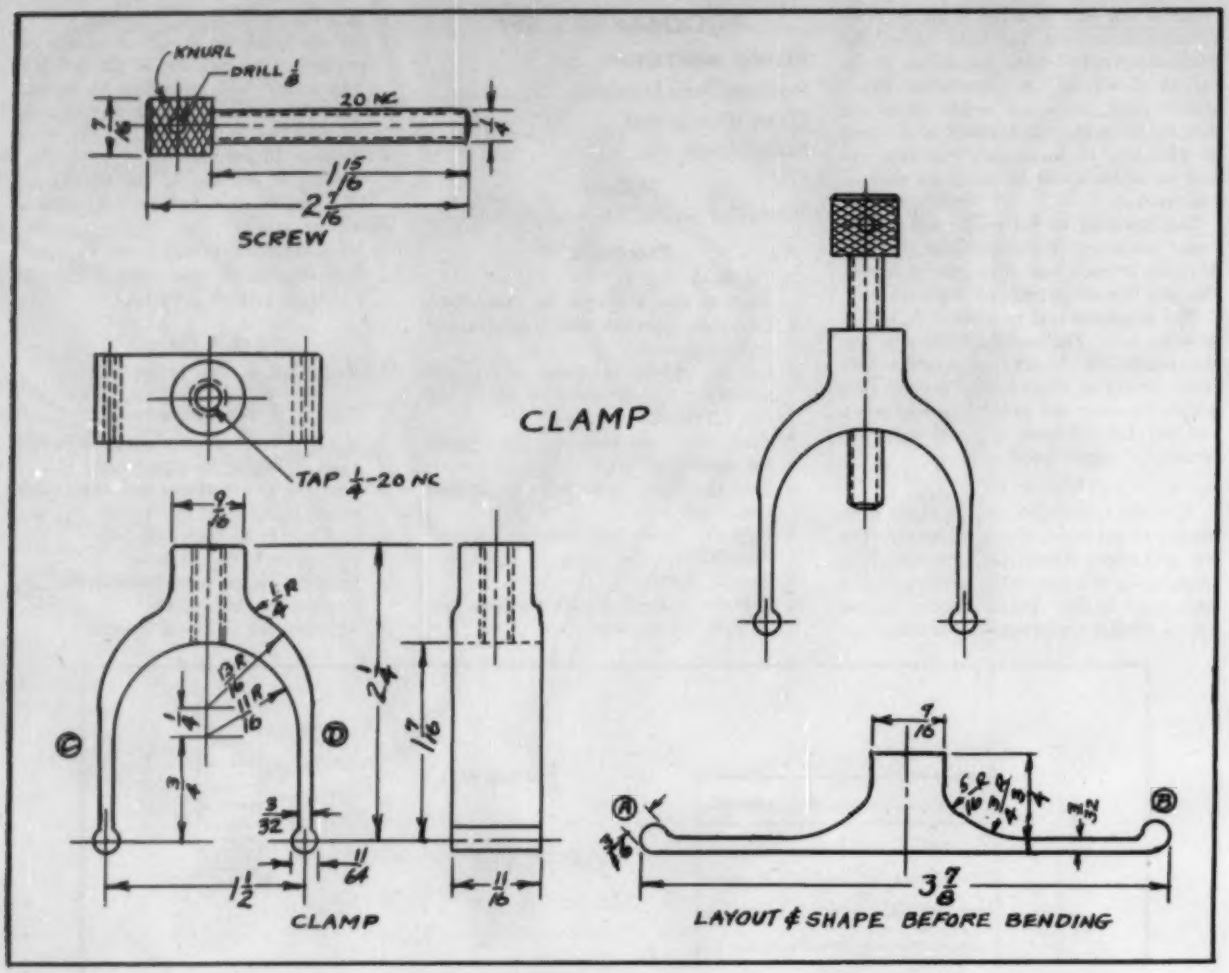
Material: Cast iron by pattern.

Procedure

1. Machine by shaper for all surfaces and edges, checking for squareness.
2. Coat the two surfaces and edges with layout fluid.
3. Lay out for all holes and slots.
4. Centerpunch for all holes.
5. Drill the 3/16 in. holes halfway through to meet in the middle.
6. Tap drill for all 10-32 holes.



The "V" Block



Clamp

7. Tap all 10–32 holes.
8. Mill the *V* slot with a 90° milling cutter.
9. Use a 1/16 in. slitting saw to cut the slot at apex of the *V* slot.
10. Use a 1/4 in. slitting saw to cut the slots to meet the 5/16 in. holes.
11. Grind all finished surfaces if possible.

Clamp

Material: 1 pc. tool steel 3/4 in. square by 4 in.

Procedure

1. Cut stock.
2. Coat one surface with layout fluid.
3. Lay out with surface gauge and dividers.
4. Shape or band saw to layout, dressing with a file.
5. Layout the 5/16 in. surface and file round.
6. Centerpunch for the 1/4 in.–20 hole.
7. Tap drill for the 1/4 in.–20 hole.
8. Tap 1/4 in.–20.
9. Heat and hammer the round ends *A* and *B* to position shown in drawing, with a brass hammer to avoid damage.
10. Heat pc. red hot and forge the legs *C* and *D* to shape shown over a pc. of 1 1/4 in. round bar held in a vise.
11. Dress all over with a fine file.
12. Heat red hot and quench in hardening oil, or draw to a blue.

Screw

Material: 1 pc. CRS 7/16 in. by 4 in.

1. Cut stock.
2. Hold in a draw chuck to turn small diameter.
3. Hold 1/4 in. diameter in draw chuck to hand knurl.
4. Face and bevel the end.
5. Cut the 1/4 in.–20 thread with a die.

Pentagon parking areas can hold 9200 cars, plus an underground motor pool and garage which house 150 vehicles.

— *Wisconsin Military District.*

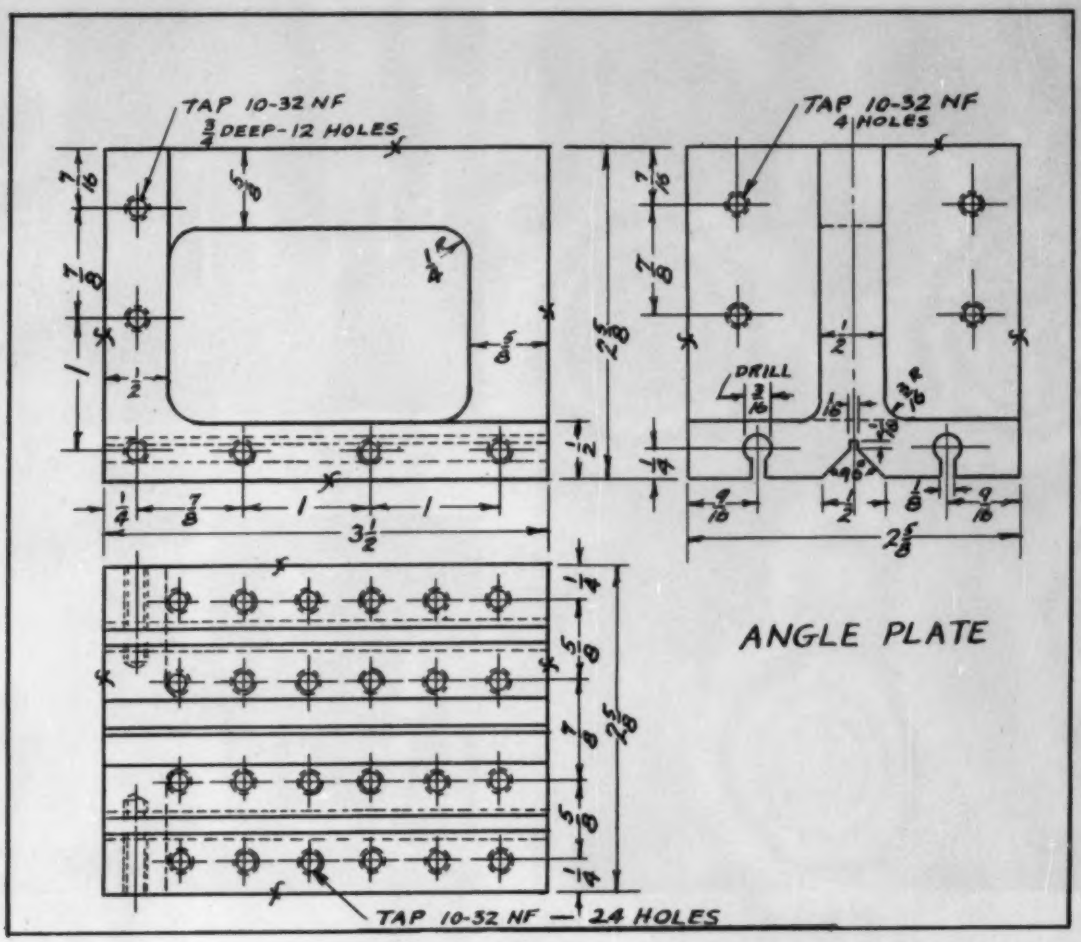
LET'S CLEAN UP

C. LEE DINNEEN
Belmont High School
Los Angeles, Calif.

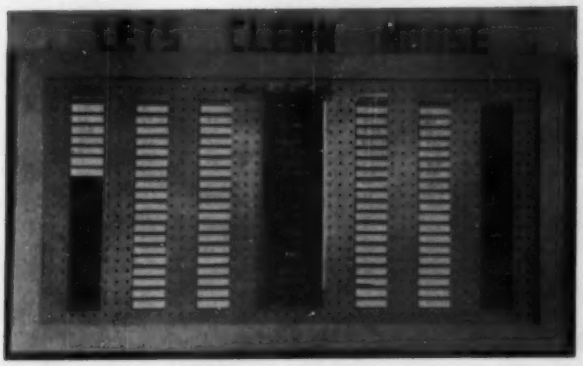
Clean up has always presented a problem. Another solution to that problem has been found through the use of this clean-up board.

The aid was constructed from a two by four piece of pegboard, odd lumber, scrap metal, and masonite.

The jobs were determined first and painted on masonite. A metal track was made to allow these jobs to slide down when the bottom one was removed. The metal name plates were made from scrap and then glued opposite the jobs spacing them two to a job. This board was set up for a six period day, however if you have only five, use the spare for a list of your Primitive Petes. The names were typed and placed in the name plates. At the end of the week the



Angle plate



The clean-up board

jobs are changed simply by removing the bottom job and placing it on top. Small round balls are placed beside the students' names who failed to do their clean-up jobs for the day.

To add a pleasing effect, the top name plates are brass and the others are gray. The background is turquoise highlighted by a border painted flamingo.

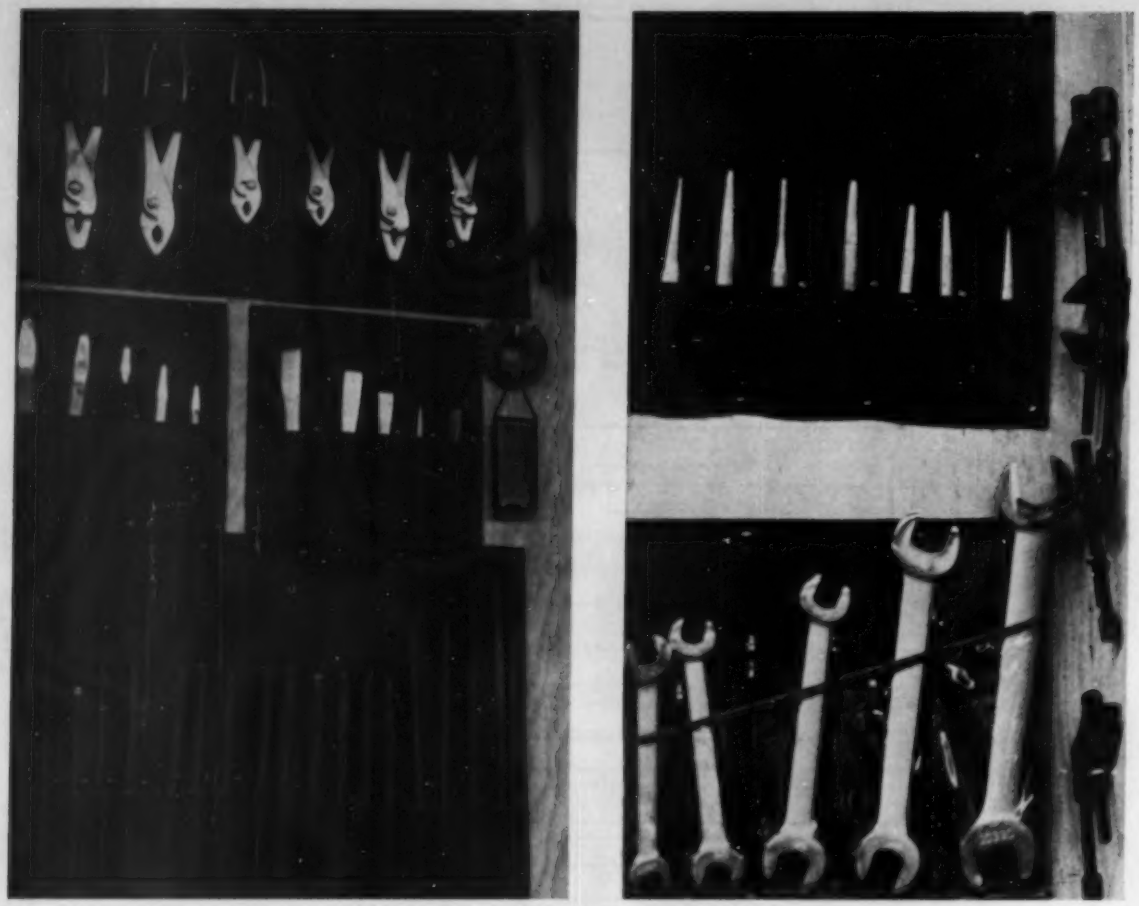
A TOUGH TOOL STORAGE PROBLEM SOLVED

JAMES E. DOYLE
Cambridge Community Unit School
Cambridge, Ill.

Tool storage can create a problem due to the irregular sizes and shapes of various tools. Hammers, saws, screwdrivers, etc., by their very nature are easily attached to a tool panel or hung up in a tool cabinet. Chisels, punches, pliers, and files are difficult to attach in a vertical position because of their design. It is an unsatisfactory arrangement to store them loose in a box or container where they are not readily accessible.

A simple approach to the solution of this problem is to sew individual pockets or loops for each tool. Pliers can be displayed by sewing appropriate size loops, large enough to accommodate the jaws but small enough to securely hold the handles. Tools such as chisels that are basically cylindrical can be effectively shown by encasing each one in a separate pocket.

The material used must be heavy enough to withstand considerable wear, but light enough to be sewn on a standard type sewing machine. Twelve ounce single filled duck canvas has been found to work very well. It may be ordered from many sources. The canvas material can be fastened to the tool panel or tool cabinet with ornamental nails or tacks.



Solving the tool storage problem

Personal Health and Safety in the Shop

CLARENCE E. GERRISH
Industrial-Arts Teacher
Vernon Public School
Vernon, Conn.

Shop Safety Rules of a General Nature

I. Think before you act in a dangerous situation.

II. Avoid eye strain due to poor lighting.

1. Sit near the front of the room if it is difficult to see normal writing on the chalkboard.

2. Avoid light reflection on your work, book, and chalkboard.

3. Have eyes checked to learn if you need glasses; if there is any doubt the teacher should follow up on this.

III. To maintain good health:

1. Stay at home if infected with a cold or some other communicable disease.

2. Maintain a room temperature of 68 deg. F., whenever possible.

3. Ventilate the room as often as necessary to dissipate irritable dust or poisonous fumes.

4. Keep recommended first aid materials available in the shop at all times.

5. Report injuries immediately so that precautions may be taken against infection and more serious disability.

6. Never watch any kind of welding without the proper eye protection.

7. Running in the shop or playing practical jokes may cause serious injury.

8. When identifying liquids, take a short "whiff" first to make sure it will not irritate the lungs or nasal passages.

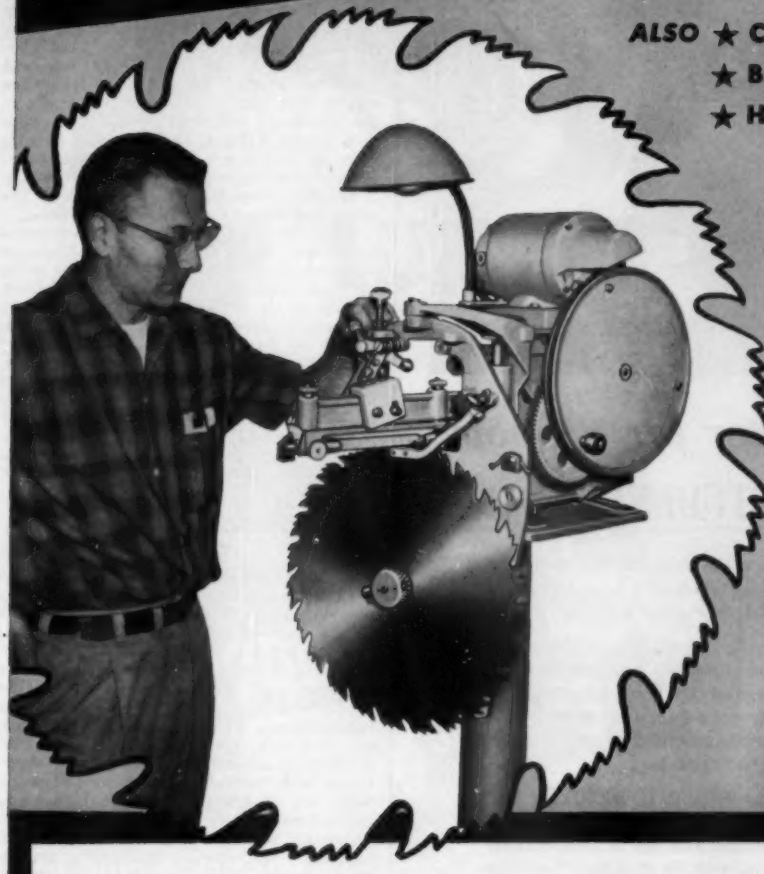
9. Fumes from carbon tetrachloride and

(Continued on page 26A)

Here's the FIRST and ONLY Machine that Automatically Files and Joints

COMBINATION RIP AND CROSSCUT SAWS

ALSO ★ CROSSCUT CIRCULAR SAWS
★ BAND SAWS
★ HAND SAWS



It's the new Model 200

FOLEY *Automatic* SAW FILER

THE NEW model 200 Foley Automatic Saw Filer is the *first* and *only* machine which will file the so-called "combination" (rip and crosscut) circular saws; also crosscut circular saws, band saws, all types of hand saws.

The Foley Saw Filer is doubly valuable in manual training departments—it keeps all your saws in perfect cutting condition at low cost and greatly prolongs their life; it also is a great asset for training students in the correct care and maintenance of both hand and power saws. With the Foley Saw Filer, the Foley Retoother (for hand saws) and Foley Power Setter, (last two not shown) you can sharpen *4 to 6 hand saws per hour.*

The exclusive Foley principle of jointing the saw as it is filed, keeps all teeth uniform in size, shape and spacing; it also keeps circular saws perfectly round. This assures a fast, smooth, true cutting saw that stays sharp longer, runs cooler, and frequently doubles the life of the saw.

30-DAY TRIAL OFFER

You may try the new Model 200 Foley Saw Filer in your own shop for 30 days. See for yourself its precision work, advanced design and quality construction—time-proved through more than 50 years manufacture and use of previous models. Write for literature and details of 30-day trial offer.

FOLEY MANUFACTURING COMPANY
3318 N. E. 5th St., Minneapolis 18, Minn.

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THAT WILL EARN AS STUDENTS LEARN!

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NEWS NOTES

(Continued from page 16A)

Design — seminars in contemporary design held four times weekly. Individual consultation in problem solving procedures in design. Instructor, Fred Zimmerman, M.F.A., B.A., Cornell, 1956; M.F.A., Iowa State University, 1958.

Rude Osolnik, chairman, industrial arts department, Berea College, Berea, Ky.

BOOKS TRANSLATED INTO CHINESE LANGUAGE

A book written before 1920 — *Light and Power Wiring* — by B. B. Burling, has been translated into the Chinese language by Franklin Publishers, Inc., of New York City, an organization that selects and translates books for overseas projects. The translation will be sent among other technical books to the Vocational Industrial Education Association, Taipai, Taiwan, Formosa. This is being done as a service to China by the International Cooperative Administration, a part of the State Department, and printed by The Bruce Publishing Company of Milwaukee.

When Mr. Burling instituted the electrical department at Boys' Trade and Technical High School in Milwaukee in 1915, he wrote the book along with ten others as a textbook. Because it is written for the beginner to understand, *Light and Power Wiring* was chosen for this overseas project.

Mr. Burling was vice-principal at Washington High from 1937 until his retirement in 1954. Previously he served as a teacher for 22 years at Boys' Technical High School.

At the age of 74, on May 28, 1958, Mr. Burling collapsed outside his home, ending his distinguished career as vice-principal, teacher, and author.

WORKSHOP SCHOLARSHIPS OFFERED

A total of 565 scholarships at 15 universities are being offered this year at the 1959 Summer Workshops in Family Finance sponsored by the National Committee for Education in Family Finance.

The workshop scholarships are open to educators who demonstrate a need and use for information and teaching materials in family finance. They include classroom teachers in schools, colleges, and teacher-training institutions, as well as administrators, supervisors, and curriculum directors. The workshops are of special interest to high school and college teachers of subjects such as home economics, social studies, business education, economics, mathematics, family life, and related courses. Credit toward a graduate degree is awarded upon successful completion of the course.

Application blanks and descriptive brochures may be obtained by writing to the headquarters of the *National Committee for Education in Family Finance, 488 Madison Ave., New York 22, N. Y.* If possible, applications should be submitted before March 31.

THE INDUSTRIAL ARTS AWARDS PROGRAM

Entry blanks, rule books, and other information on Ford Motor Company's 1959 Industrial Arts Awards program are now being distributed to more than 40,000 manual arts teachers and other educators.

The Industrial Arts Awards program, now in its thirteenth year, is sponsored by Ford to encourage pride of craftsmanship and creative imagination among students of junior, senior, and technical high schools.

More than 1500 individual awards totaling

(Continued on page 22A)

the WINNERS! in B-G's LUMBER CONTEST

"Which Lumber is Used Most in Order of Popularity?"

2nd Prize, $200

JERRY C. OLSON
Industrial Arts Teacher
Richland High School
Gibsonia, Penna.

1st Prize, $300

DANIEL E. HESS
Woodworking Instructor
Uniontown Joint Senior
High School
Uniontown, Penna.

3rd Prize, $100

PAUL TIMASHENKA
Industrial Arts Instructor, East Deer - Frazier
Union School
Creighton, Penna.

● THERE THEY ARE, FOLKS . . . . Congratulations to them—and oddly enough, they're all from Pennsylvania. Entries came from all over the country, with every imaginable lumber arrangement. It sure was a guessing contest—but a great big thanks to all of you who tried . . . . (it might be consoling to know that even the winners didn't get all correct). Better luck next time! Checks have been mailed to the winners, thank-you letters and souvenirs to all other entries.

THE CORRECT LIST—AS TAKEN FROM B-G's 1957 NATIONAL SCHOOL LUMBER SALES RECORDS

1. Poplar	6. Select Sugar Pine	11. Red Oak	16. Shop Pine
2. Willow	7. Black Walnut	12. Genuine Mahogany	17. Ash
3. Philippine Mahogany	8. Aromatic Red Cedar	13. Birch	18. Red Gum
4. Basswood	9. Antique White Pine	14. White Oak	19. Cypress
5. Hard Maple	10. Cherry	15. Limba	20. Balsa

B|G

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Lumber, Machinery, Benches, and Hand Tools

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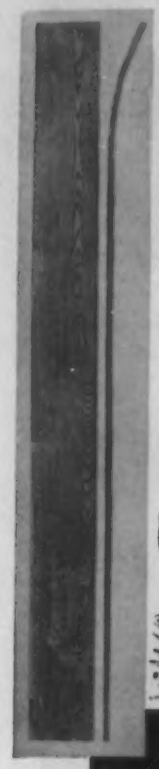

NEW LEARNING UNIT

STUDENTS BUILD

WATER SKIS

from quality S-4-S (bent only) stock— finest grade fittings supplied

Students start with rough pre-bent blanks shown here

Now any student can own the finest water skis it is possible to build and, at the same time, increase his woodworking skills. The ski blanks and fittings are supplied by one of the world's largest producers of quality water skis. Scale drawings and instruction sheet included.

SPECIFICATIONS:

Stock ⅝" thick x 7" wide x 6' long. Permanently bent at one end with hardwood spline reinforcing toe of ski. Choice of Marine Plywood with Crezon surface, Sitka Spruce, Philippine Mahogany, Solid White Ash. BINDINGS: White Neoprene rubber. Aluminum parts, single adjustment, self-locking heel plate.

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WESTERN WOOD MFG. CO. • Portland, Oregon

NEWS NOTES

(Continued from page 20A)

approximately $50,000 are offered each year. These include 72 prizes each in the first, second, third, and fourth place categories; 432 honorable mentions; 12 creative design prizes; six ingenuity prizes, and approximately 864 place awards.

The 32 winners of the coveted Outstanding Achievement Award — highest prize in the competition — are annually given expense-paid trips to Dearborn, Mich., along with their instructors.

Competition is open to students in any public, private, parochial, or vocational school in the United States, Hawaii, Puerto Rico, or Canada, who on July 1, 1959, has not yet reached his 21st birthday.

Entries are divided into 14 divisions — mechanical drawing, woodworking, electrical, graphic arts, leather, ceramics, jewelry, models, wrought metal, patternmaking and molding, plastics, machine shop, architectural drawing, and an open division for projects which cannot be accurately included in one or another specific division.

Ford Motor Company, Dearborn, Mich.

STUDENT CRAFTSMAN FAIR

The Longview Industrial Arts and Vocational Education Departments, in conjunction with the Southwest Washington Industrial Arts Association will hold a Southwest Washingto Student Craftsman Fair on April 10 and 11, 1959.

This is the program sponsored annually by the Ford Motor Company.

An anticipated 800 entries are expected in the areas of wood, metal, drawing, ceramics, plastics, leather, printing, etc., and the open division. This is the first such fair in this area.

The counties invited to participate are Cowlitz, Clark, Skamania, and Waikaikum.

The committee members are Leroy Fulton, Fred Hess, Edward Davies, and Floyd Nelson, Jr.

Inquiries can be addressed to *Floyd Nelson, Jr., chairman, Monticello Junior High Metal Shop, Longview, Wash.*

WAR ORPHANS EDUCATION PROGRAM

In a survey recently completed by the Veterans Administration concerning the educational program which has been in effect for the past two years for the children of deceased war veterans, it was disclosed that one out of every five War Orphans students has been attracted to the fast-growing field of science. Of the 6000 young people covered by the VA survey, more than 1200 had gone into science. Five hundred of them chose engineering; another 500, medicine and related fields; and more than 200, the natural sciences such as physics and chemistry. In the sciences, men outnumbered the women two to one.

Nearly 2000 others — slightly more women than men — chose either the humanities or general college courses with no major yet specified.

More than 800 War Orphans students selected teaching, 70 per cent of them women. Nearly 600 took business administration and managerial courses, 70 per cent males. Social studies and welfare work attracted 200, nearly two thirds men. Nearly 100 — 88 per cent men — entered the ministry.

The War Orphans Education program is for the sons and daughters of World War I, World War II, or Korean War veterans who died of service-connected causes. Generally, young men and women must be between 18 and 23 to enroll in school. They may receive up to 36 months of schooling, with VA paying an allowance of up to $110 a month.

(Continued on next page)

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Baldor GRINDERS

Baldor's "student-styled" grinders provide maximum safety in the hands of young, inexperienced users. Slow speed (1725 RPM) avoids spoilage . . . builds confidence . . . helps student do better work. Perfect for plastics, cellulose materials, soft metals. Also available in convential speed (3450 RPM). Other advantages include:

- Flanges, wheels, shafts meet American Standard Safety Code requirements!
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The Copper Shop Division

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Dept. MC-42, 1924 Euclid Ave., Cleveland 15, Ohio

NEWS NOTES

UNIVERSITY OF HAWAII SUMMER SESSION

The summer session at the University of Hawaii will be conducted from June 21 through August 1, 1959. Air and steamship accommodations to the Manoa campus in Honolulu has been set on all major steamship and air lines. Reservations for travel and enrollment at the University program are now being accepted.

A full schedule of planned activities is offered to the members of the University Study Program to Hawaii. Credits earned are transferable to Mainland colleges.

Complete information about the Summer Session program is available by writing to *Dr. Robert E. Cralle, University Study Tour, 3305 Wilshire Blvd., Los Angeles 5, Calif.*

NEW WESTERN PINE PUBLICATION

"About Lumber Paneling," a new book just published by the Western Pine Association, features the linearity and versatility of sawn lumber paneling.

The 8-page, full-color booklet shows the vast scope of possibility for making use of the lines formed by the edges of boards in creating special effects for interior wall construction. It also gives some details as to the use of sawn lumber paneling, grades, sizes, paneling patterns, and even surface textures which are available or may be attained.

Among the ideas shown are the use of paneling in herringbone, horizontal, vertical, radial, angle, "round-and-round," board-and-batt, board-and-gap, board-on-board, contrast paneling, and combinations. Textures and colors are also covered.

The 8½ by 11-inch booklet is designed for the layman, the builder, craftsman, and designer. Single copies are available free, and extra copies at five cents each. *Western Pine Association, 510 Yeon Building, Portland 4, Ore.*

AFS FOUNDRY INSTRUCTORS SEMINAR

The University of Illinois, Urbana, Ill., was named as the site for the 4th AFS Foundry Instructors Seminar, to be held June 18 to 20, 1959.

This annual function, under the direction of its Education Division, is sponsored by the American Foundrymen's Society, international technical society of the metal castings industry. It is intended primarily for teachers and supervisors of foundry and patternmaking subjects in secondary schools. An increasing number of teachers, training educators, and directors in state education departments are availing themselves of these informative programs, to keep abreast of the new techniques, materials, and methods in the castings field, for use in the development and improvement of their own school programs.

This year's program will concentrate on the exchange of ideas between educators and industry. It will feature technical sessions and demonstrations on: teaching aids, curricula, shop layout, laboratory equipment, new casting methods, and molding techniques.

Names of new officers and directors of this group will be announced at the Society's Annual Business Meeting in Chicago, April 16, during the AFS-sponsored Engineered Castings Show and the 63d Castings Congress.

Further information on the June event may be had by writing to: *American Foundrymen's Society, Golf & Wolf Rds., Des Plaines, Ill.*

(Continued on next page)

1st in Performance, Safety and Value!

Atlas WOODWORKING TOOLS

6" JOINTER

The Atlas 6-inch jointer, for example, is the most copied of all jointers, yet it is still far ahead of the field. Look at these features of superiority —

- Tables are ground to align within .005" throughout their 42" length.
- 10-pound cutter-head-and-spindle are *one piece*, precision ground for perfect balance — can be quickly removed and blades sharpened while in cutter-head — a real time saver.
- Lubricated-for-life ball bearings.
- Blades guarded front and rear of fence.
- 32" x 4⅜" fence slides smoothly on machined ways, locks or releases instantly, *always* touches rear table for added safety.
- To save you time, rear table is stationary for permanent alignment with head.

Get all the facts, write for a catalog today.

BELT AND DISC SANDER

The Atlas sander equips your shop for finishing projects of almost any shape or size — in a fraction of the time and without the difficult hard work of hand sanding. It sands boards of any length, width or shape — angles and double angles — metals and plastics as well as wood.

Has 10" diameter disc . . . 4" wide belt . . . four sealed-for-life ball bearings. Table tilts 45° . . . may be used with either disc or belt. Belt sander operates in both horizontal and vertical positions. Belt guard and stop are removable for sanding curved pieces on either drum, and disc and guard are easily removable for handling wide boards on belt. Ruggedly built throughout for trouble-free service. Write for literature today.

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NEWS NOTES

(Continued from previous page)

"THE TWENTIETH CENTURY" FILMS

The prize-winning CBS-TV documentary series, "The Twentieth Century," is available to high schools, colleges, and community organizations for group showings as a free service of the Prudential Insurance Company of America. Local Prudential agents throughout the country are handling requests for the films.

Currently in release on 16mm. prints are 19 half-hour and six one-hour programs from last season's series, "The Twentieth Century's" first year on the air. Additional programs from the present season will be available shortly after their telecasts this fall and winter.

With CBS senior newsman Walter Cronkite as commentator, the films encompass great events and personalities of the past 50 years, including special headline issues dealing with contemporary matters. Subjects range from the biographical, to the scientific on jets, atomic developments and missiles.

Distribution of the series is arranged by *Association Films, Inc., 347 Madison Ave., New York 17, N. Y.*, national motion picture distributor.

HIGH SCHOOL DRIVER EDUCATION AWARD

Governor William G. Stratton of Illinois recently received from the Association of Casualty and Surety Companies a national award recognizing an improved program of driver education in Illinois high schools. The presentation was made to Governor Stratton in his office by Donald K. Weiser, Chicago manager of the Aetna Casualty and Surety Company.

Mr. Weiser commended Governor Stratton, traffic officials, school administrators, driver education teachers, and co-operating civic groups for support of the Award Program and their hard work in building a strong state program in driver education.

The Award Program is the recognized and official medium of determining state progress in the introduction, expansion, and improvement of high school driver education. It is sponsored by the Capital Stock Insurance industry through the Association of Casualty and Surety Companies.

States winning the top award in the last school year were Delaware, Massachusetts, Michigan, Oklahoma, Utah, and Vermont.

Progress Awards went to Florida, Indiana, Missouri, Texas, and Montana, as well as Illinois.

"NEW HORIZONS FOR WOOD"

A new, 16mm. film, entitled "New Horizons for Wood," has recently been made and released for distribution by the State University College of Forestry at Syracuse University.

The new film was written, directed, and photographed by a member of the faculty of the College of Forestry, Dr. William M. Harlow. It is the story of the intricate secrets of wood's structure and its physical and chemical properties, and how research scientists at the State University College of Forestry at Syracuse University, are mastering the secrets of nature and obtaining amazing results as they explore the treasure houses of knowledge hidden in wood.

The film runs 28 and one half minutes in length, and brings to the motion picture screen vivid close-ups of vibration patterns of wooden panels; time-lapse sequences showing how wood dries; the action of woodworking machines as seen through the lens of the high-speed camera; and views of testing machines graphically illustrating the great strength of wooden beams. Many unusual scenes and much more information are included in "New Horizons for Wood."

The film was designed for showing to professional research groups and industries, service clubs and other similar organizations; also would be of interest to high school students looking forward to careers in the engineering field.

Individual prints available for purchase; also will be loaned to New York State users.

Forest Extension & Public Relations Division, State University College of Forestry at Syracuse University, Syracuse 10, N. Y.

NATIONAL AVIATION EDUCATION WORKSHOP

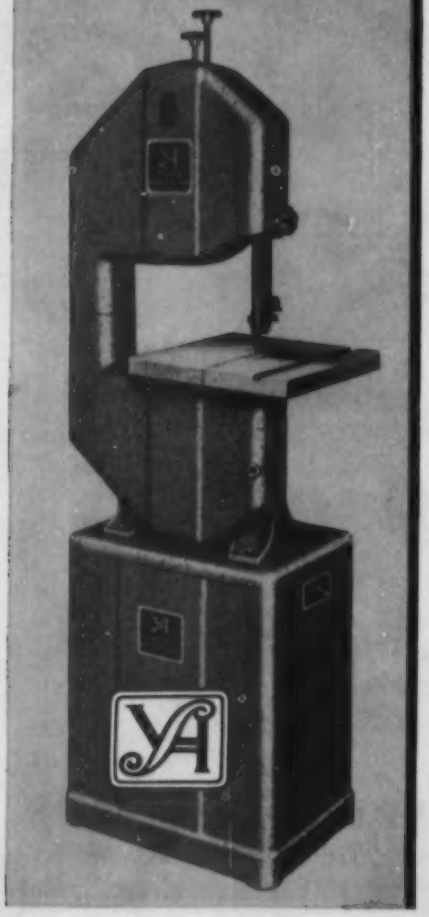
Revell, Inc., Venice, Calif., announces the availability of six scholarships to be awarded to teachers of elementary, secondary, and college level. A scholarship grant covers fees and living expense costs of attending the National Aviation Education Workshop to be held at the Montana State University, Missoula, Mont., from June 29 to July 31, 1959.

The Workshop is co-sponsored by the Montana State University, Civil Air Patrol, United States Air Force, and the Montana Aeronautics Commission. Many aircraft industries, air transportation companies, governmental agencies, and representatives of the Army and Navy are co-operating with the workshop directors. Those attending the Workshop may earn up to 5 semester hours graduate or undergraduate credit.

The scholarships will be awarded on the basis of an essay contest. Each essay should contain the best expression of a teacher's opinions on the needs of aerospace-age education.

(Continued on page 26A)

Modern, Rugged 14" Band Saw



Heavily-ribbed, one-piece frame eliminates vibration and provides sturdy support for work. Adjustments for table tilt, wheel tracking, blade tension, guide placement and changing blades are made from operator's position. The table, supported by double trunnions, tilts 45° right and 10° left. A spring-loaded stop pin quickly resets the table at 90°. Aluminum wheels are covered by hinged doors, and the blade is completely guarded except at point of cut. $191, less motor and controls.

YATES-AMERICAN

Beloit, Wisconsin

Shaper

12" Lathe

8" Jointer

10" Tilting-Arbor Circular Saw

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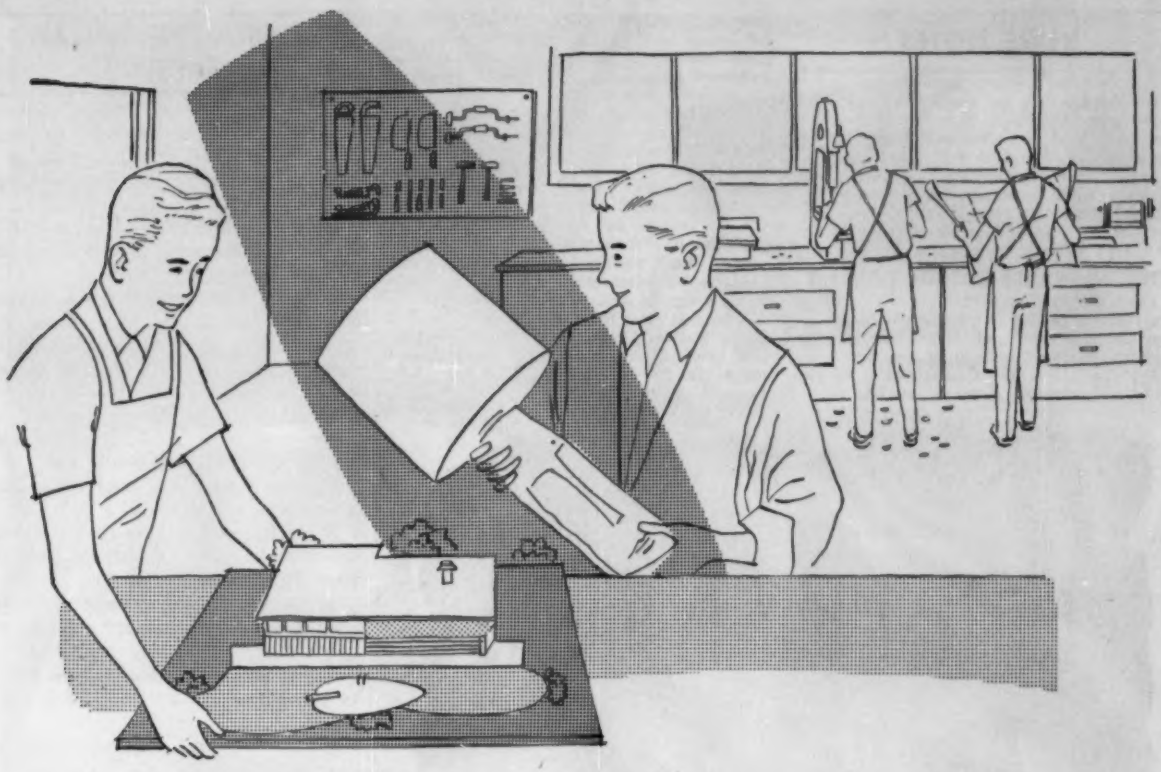


How about your students... are they preparing for this year's big $50,000

FORD iaa PROGRAM?

There's still time for your students to enter and win valuable prizes offered in Ford's big 1959 Industrial Arts Awards Program!

They will compete for more than 1,500 prizes –totaling $50,000. And 32 outstanding students *and their teachers* will be awarded fun-packed, all-expense-paid trips to Dynamic Detroit–the Motor Capital of the world.

Students from public, private, and parochial schools in the United States, its territories and Canada may enter. *Any* high-quality industrial arts or industrial vocational project made by students in the 7th through 12th grades is eligible.

Many student-teacher teams will win prizes and national recognition–*why not yours?* Send for rules booklet and entry blanks today.

FORD INDUSTRIAL ARTS AWARDS, Dept. B
FORD MOTOR COMPANY, The American Road, Dearborn, Michigan

I would like to have the official I.A.A. rules booklet and entry blanks. Please send to:

NAME_____

ADDRESS_____

CITY_____ ZONE_____ STATE_____

INDUSTRIAL ARTS AWARDS FORD MOTOR COMPANY

ENTRIES MUST BE RECEIVED BY THESE DATES

JUNE 10
Salt Lake City–for projects made in Montana, Wyoming, Colorado, New Mexico, and states farther west

JUNE 25
Dearborn, Michigan–for projects made in all other states

(For more information from advertisers, use the postcard on page 49A)

NEWS NOTES

(Continued from page 24A)

The contest rules are simple. Any currently licensed or certificated classroom teacher, on any grade level and anywhere in the United States and its territories, is eligible to enter.

Any information desired in relation to these scholarships can be obtained by writing to *Dr. Marian Wagstaff, Space Scholarships, P.O. Box 222, Venice, Calif.* Entries should be forwarded not later than May 1, 1959.

STERLING SILVER DESIGN CONTEST

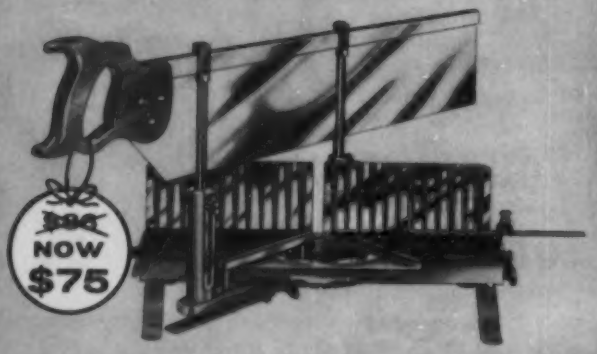
The 1959 Sterling Today Student Design Competition (holloware) will be open to design students only, as announced by the Sterling Silversmiths Guild of America.

The purpose of the competition is to encourage imaginative design in sterling silver. Any U. S. resident taking design courses at the college level may submit one or more designs (sketch or photograph) for sterling holloware pieces useful in the home. Deadline for entries is June 1, 1959.

Seven cash awards totaling eleven hundred dollars will be made for outstanding design. The first three prize winners will also receive the Sterling Silversmiths Guild of America Medal and a trip to New York for the presentation of awards. As in previous years, the winning designs will be sent as a traveling exhibition to silverware dealers throughout the country. Each student winner will retain full rights to his design and will receive a sample of his design in silver after the exhibition.

Rules and entry blanks for the 1959 Sterling Today Student Design Competition are available now on request to the *Sterling Silversmiths Guild of America, 551 Fifth Ave., New York 17, N. Y.*

HOTTEST BUY IN TOWN!



SAVE $11 on the world's best mitre box . . . LANGDON ACME!

Now the *best* is even a *better bargain!* Save $11 on the famous Millers Falls *Langdon Acme* mitre box. Number One choice of school shops and professionals.

Ideal for instruction, this is the most accurate mitre box there is. Rugged construction, one-piece bed and back give years of service. "Oilite" bronze bearings for smooth saw glide. An outstanding school shop value!

Offer lasts for limited time only.

MILLERS FALLS TOOLS
SINCE 1868

Millers Falls Company
Dept. IA-45, Greenfield, Mass.

PERSONAL HEALTH AND SAFETY

(Continued from page 13A)

paint remover cause respiratory irritation. Use them in a well ventilated place.

10. Use flammable materials in a well ventilated place.

11. Waste materials should be put in the proper container to prevent injury and fire.

12. Good housekeeping habits prevent many accidents.

13. Practice being courteous, considerate and obliging at all times, under all circumstances.

14. Know fire regulations, the shop has many combustible materials which make fires probable when carelessly used.

15. Always wash your hands before leaving the shop at the end of a class.

16. Lift correctly; keep the knees bent, the body straight and push the body upward with the legs.

17. Report unsafe or dangerous equipment and conditions immediately, to prevent injury.

NOTE: The following safety rules pertain to personal safety and the well being of others.

General

1. When working with hot metal, cool it or put it in an out-of-the-way place when leaving it.

2. Test the sharpness of a tool on wood, not on your hand; it prevents serious cuts.

3. Never hold nails, tacks, or screws in your mouth.

4. Picking up sheet metal carelessly may result in a bad cut from sharp edges.

5. Warn others when you are handling long pieces of wood or metal, to prevent accidental injury.

6. Protect your eyes by wearing goggles while chipping metal.

7. All files should be fitted with wood handles to prevent the tang from penetrating the hand or wrist.

8. Always cut or chisel away from yourself.

9. Cold chisels with a mushroom head should not be used. A piece of the mushroom may break off and injure someone.

10. Tools such as a brace and bit improperly carried may cause serious injury.

11. Never stick screw drivers or other objects in an electrical outlet.

12. Always extract or bend over nails when tearing apart crates, boxes, or other articles fastened with nails.

13. When giving tools to another person, pass them handle first.

14. Report broken tools immediately; loose or broken handles are dangerous.

Molding

1. Pour molten metal with care to prevent serious burns.

(Continued on page 28A)

POSTS reputation has been built on fair values. Never before have POST instruments been offered at greater savings.

Special Values

POST DRAWING INSTRUMENT SETS FOR HIGH SCHOOLS

These four POST instrument sets are handcrafted and built for years of service. Each instrument is precision built and each set is a very special value. Select the set that fits your needs and order today for prompt delivery.

BIG BOW 1148P—A special economy assortment of instruments. Set contains: 5¾" Big Bow Compass and 4" Bow Compass both with pen, pencil and divider parts; 5½" divider; draftsman's mechanical pencil; 6" beam bar extension for Big Bow with holder for pen, pencil or divider parts. Extra ruling pen handle is furnished for use with compass pen part. Metal vial containing extra leads and needle points.

special value $9.37

BIG BOW 1148—Similar to Set 1148P, but with 5" ruling pen in place of mechanical pencil.

special value $9.37

BIG BOW 752MS—Custom-Master instruments in attractive Permacase. Case is metal, covered with deep-grained simulated black leather. Interior of case is molded plastic with red suede finish. Metal hinges and button lock. Set contains: 6¾" Big Bow and 4" Bow Compasses, both with interchangeable pen, pencil and divider parts; 6½" hairspring dividers with head centering device; 5½" steel spring ruling pen; metal vial with extra leads and needle points.

special value $11.62

BIG BOW 752LS—Big Bow Compass set containing: 6¾" Big Bow Compass with interchangeable pen, pencil and divider parts; 4½" Bow Compass; 6" divider; 5" ruling pen. Furnished in a genuine leather zipper pocket case.

special value $11.62

SKILLMASTER 1110C—This set is far higher in quality than many more expensive sets. Contains: One each, 5" and 5½" ruling pen; one each, 3¾" center adjustment steel spring bow divider, bow pencil and bow pen; 6" hairspring divider with straightening device and removable needle points; 6" compass with straightening device, lengthening bar and interchangeable pen and pencil parts. Each set includes a screw driver, extra needle points, lead box and a well stocked kit of replacement parts.

special value $12.37

SKILLMASTER 1110—Same as 1110C except bow instruments have sidewheel adjustment.

special value $11.25

Frederick Post Company, 3648 North Avondale Ave., Chicago 18, Illinois.

POST

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picked by professionals

Reach for a Venus drawing pencil and get the sharper, clearer line (in all 17 degrees of hardness) your work demands. Venus homogenized lead holds a needle point longer, insures uniform smoothness, perfect smudge-free work. Pressure proofing seals the lead to the wood along its full length so the Venus is stronger. Prove Venus superiority for yourself. *Send for the educational brochure "Atomic Energy and You" and get a FREE Venus Drawing Pencil.*

VENUS drawing pencils

VENUS PEN & PENCIL CORP., LEWISBURG, TENN.

PERSONAL HEALTH AND SAFETY

(Continued from page 26A)

2. Handle melting pot delicately to prevent spilling and serious burns due to splashing molten metal.

3. Stand away while pouring molten metal; this may prevent serious burns on the legs.

4. Never drop the melting pot, although you are being burned from splashing metal.

5. Never hold your face directly over a riser.

6. Always hold melting pot securely to prevent dropping it especially when it contains molten metal.

Forging

1. Handling hot metal carelessly may cause serious burns to yourself and/or others.

2. Hot metal placed on a wooden surface causes a fire hazard.

3. Metal lying around the forge may be hot. Test it before picking it up with the bare hands.

4. Do not leave hot metal lying around where someone may get burned by picking it up.

5. Keep flammable materials away from the forge.

6. Cool the tongs before putting them away.

Finishing

1. Paint remover is highly toxic, use in a well-ventilated room.

2. Paint in a well-ventilated room to prevent intoxication from paint thinner fumes.

3. Lead poisoning may result from prolonged usage of lead based paint or by not washing hands before eating.

Electricity

1. Do not stand in water puddles or on moist floors when replacing fuses.

2. Be sure hands are dry when turning on an electric switch.

Power Machinery Safety Rules

General:

1. Turn "off" machines while making adjustments to prevent injury to yourself and others.

2. Never wear gloves when working around moving parts of a machine or revolving work.

3. Roll sleeves up before going to work on power machinery.

4. Loose clothing worn around machinery may get caught and cause injury.

5. Wrist watches and rings sometimes get caught if worn while working around machinery.

6. Sleeves should be rolled up or cut off at the elbows, when working around power machinery.

7. Startling anyone who is working at a machine, may result in serious injury.

NEW 1959 CATALOG

FREE ON REQUEST

Featuring

GUARANTEED QUALITY SCHOOL SHOP LUMBER

Write today for this new, 36-page catalog—1959-S. Different from most catalogs, it contains the following information you'll find helpful.

- Illustrations and text describing characteristics of 16 species of lumber used in School Shop projects.
- Information on drawing boards, dowels, turning squares, plywoods, economical "shorts" and water ski equipment.
- Delivered prices for cities east of the Mississippi; f.o.b. prices to points west of the Mississippi.
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When you buy HARCO lumber, you get guaranteed quality! Our School Shop lumber is guaranteed as to species, seasoning, texture and grade — assuring maximum usability and minimum waste.

For free catalog, write Hardwood Corporation of America at the address below.

HARDWOOD CORPORATION OF AMERICA

Educational Lumber Division

P. O. Drawer 1091 — ASHEVILLE, N. C.

(For more information from advertisers, use the postcard on page 49A)

8. Use a brush or a thin piece of wood to remove metal chips.
(*Do not use your bare hands.*)
9. Keep rags saturated with oil, grease, or paint in metal containers.
10. Be sure the guards are secured in place before operating a machine.
11. Never use power machines when the instructor is out of the room.
12. Always revolve work manually before starting a machine.
13. Do not leave a machine until it has stopped.

Wood Lathe

1. Never measure material while it is revolving in a lathe.
2. Always revolve the material by hand before turning the lathe *on*.
3. Double check security of tail stock and tool rest locking devices before turning the lathe "on."
4. Stand out of the path of possible flying stock when turning the lathe "on."
5. A loosely held tool may get caught between the work and tool rest. It may be thrown and injure someone.
6. Remove chuck key and wrenches immediately after tightening the jaws and lathe.

Jointer

1. Never pass hands over knives.
2. Never run a piece of stock shorter than 12 in. across the jointer.
3. Never operate the jointer unless the guard is in place.
4. Stand out of the path of flying stock in case of *kick back*.
5. Use a push shoe when surfacing short or thin pieces.

Circular Saw

1. Use a *push stick* while sawing short or narrow pieces of wood, and when approaching the end of long pieces.
2. Stand out of the path of material which may be *kicked back* to prevent injury.
3. Always hold lumber securely to prevent injury to the operator and observers.
4. Hook fingers over the fence whenever possible, to prevent injury to your fingers.
5. Be sure the safety guard is in place whenever it is possible to use it.
6. Pull the electric plug from the socket, if possible, when changing blades.
7. Adjust the blade to extend about ⅛ in. above the work being cut.
8. Use a clearance block when the fence is used in conjunction with a miter gauge to cut pieces of equal length. This will prevent wedging of the lumber between the fence and blade.

Band Saw

1. If blade breaks turn the switch off, and stand back from the machine immediately.
2. Never open the doors until the drive and idler wheels have stopped.

(Continued on next page)

Now students can have the

Master Craftsman's Micrometer

You'll be pleased to see the fine quality you get in these mikes, at prices students can afford.

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PERSONAL HEALTH AND SAFETY

(Continued from previous page)

3. Keep the fingers a safe distance from the blade.

Jig Saw

1. Do not feed thick pieces of stock at an excessive rate of speed.

Router

1. Grip router securely when operating the router by hand.
2. Make sure bits are secure in the router.

Belt and Disk Sander

1. Stand out of the path of flying material from the belt.
2. Always use the right hand half of the disk for sanding.

Drill Press

1. Stock held loosely while drilling may slip out of the hand and cause serious injury.
2. Always remove chuck key after installing a drill. A flying key may injure someone.
3. Beware of loose clothing getting caught with a revolving drill.
4. Use drill press vise to hold small pieces being drilled. Save your fingers.
5. Reduce pressure on drill when it starts to come through the work. This reduces danger of metal being thrown into someone.

Pedestal, or Bench Grinder

1. Always use a protective device (goggles or shield) to protect your eyes from small particles of abrasive which fly from the surface of a grinding wheel.
2. The tool rest should have a clearance of 1/8 in. with the grinding wheel. The wheel may break if material becomes wedged.
3. Stand out of the path of possible flying material from the grinding wheel.
4. Grinding on the side of a grinding wheel may cause the wheel to break and injure someone.
5. Serious damage to the fingers may result if they come in contact with the grinding wheel while it is in motion.

Milling Machine

1. Wear goggles to prevent metal chips from lodging in eyes.
2. Be sure the work is held securely to prevent injury to observers.
3. Use a brush or a thin piece of wood to remove metal chips.
4. Stop the machine when changing V belts.
5. Stop the machine when making adjustments.

Metal Lathe

1. Never measure material while it is revolving in a lathe.
2. Always revolve the material by hand before turning on a lathe.
3. Double check security of tail stock and tool rest locking on devices before turning on the lathe.
4. Stand out of the path of possible flying stock when turning the lathe.
5. A loosely held tool may get caught between the work and tool rest. It may be thrown and injure someone.
6. Remove chuck key and wrenches immediately after tightening the jaws and lathe.
7. Remove metal chips with a brush or a thin piece of wood. Do not remove them with the bare hands.

Acetylene Welding

1. Before you pick up a piece of metal lying around the welding area, test each piece to make sure it is not hot.
2. Do not grasp a welding rod or flint lighter which has been placed on the welding table until it has been tested for being hot.
3. Using goggles to watch welding operations prevents eye burn, and flying hot metal from injuring the eyes.
4. Never oil any part of the welder. The combination of oxygen with oily or greasy substances causes spontaneous combustion.
5. Never light torch from red hot metal

(Continued on page 32A)

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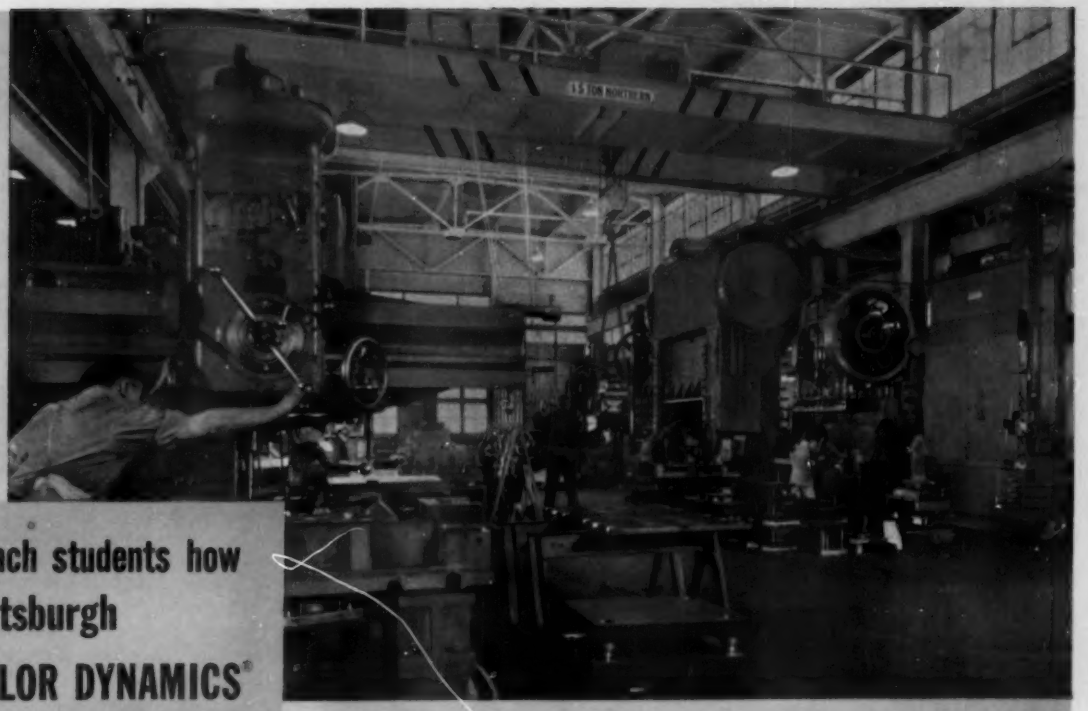

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PERSONAL HEALTH AND SAFETY

(Continued from page 30A)

or matches. Flashback may occur and cause an explosion.

6. Handle a lighted torch carefully to prevent burning someone.

7. Welding on a closed container causes explosions due to expanding gasses. The container should be free from flammable liquids and fumes.

8. Never weld on a cement floor. The heat from the flame cracks off the surface cement and scatters it with considerable force.

9. Be careful not to knock off a cylinder valve. The escaping gas causes a jet engine action and is capable of sending the cylinder through a concrete wall.

Electric Welding

1. Ultra violet and infra-red from the arc may cause skin burn if the body is not properly protected.

2. White clothing should not be worn while arc welding because it reflects light rays and causes skin burn.

3. Temporary blindness and eye burns result from watching the arc with the naked eye.

4. Warn bystanders that you are ready to strike an arc so that they can get protective eye shields in place.

5. Electrodes which are stuck to the parent metal may be hot. Test it before breaking it loose by hand.

6. Shield your eyes when chipping slag from a weld.

7. Warn bystanders to turn away while chipping slag from a weld. It will prevent flying slag from lodging in their eyes.

8. Be sure that the room is well ventilated to prevent respiratory irritation due to poisonous fumes given off while welding.

9. Touching the bare electrode while the welder is *on* may result in serious burns.

10. Do not touch the un-insulated portion of the electrode holder while the welder is in operation.

11. Do not place electrode holder on work. If the welder is *on*, serious damage may result to the operator or the machine.

12. Do not touch work with one hand while the electrode holder is being held in the other. A serious burn may result if the welder is *on*.

13. The operator should wear a leather apron if possible, and wear pants which extend below shoe tops. The pants should have no cuffs.

14. Use pliers or tongs to pick up work which has been welded, it retains considerable heat for some time.

15. Always use noncombustible material to support your work.

16. In case of a severe electric shock call a doctor.

17. Be sure you are insulated from the ground and work when arc welding to prevent electric shocks.

Mechanics

1. Wipe oil and grease off the floor immediately to prevent a bad fall.

2. Sulphuric Acid burns the body and eats away clothing. (Soda water neutralizes sulphuric acid.)

3. Use adjustable stands in conjunction with hydraulic jacks as a safety factor.

4. Pipe exhaust systems to the out-of-doors to prevent asphyxiation.

5. Use the proper wrenches for the job, to prevent injury.

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Althouse, A. D., *Modern Welding Practice*.

Smith, Robert E., *Machine Woodworking* (Bloomington, Ill.: McKnight & McKnight Publishers, 1948), 152 pp.

Smith, Robert E., *Machining of Metal* (Bloomington, Ill.: McKnight & McKnight Publishers, 1949), 224 pp.

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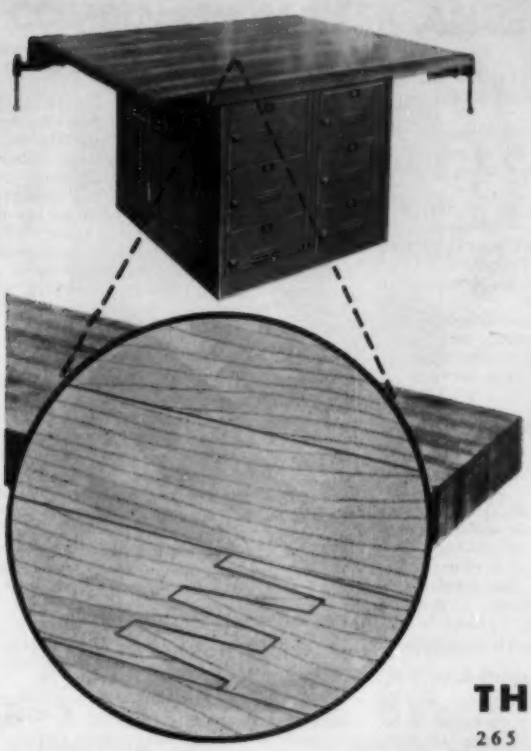
New Publications

Modern Foundry Practice

By E. D. Howard. Cloth, 464 pp., $5\frac{13}{16}$ by

(Continued on page 34A)



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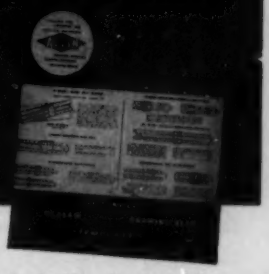

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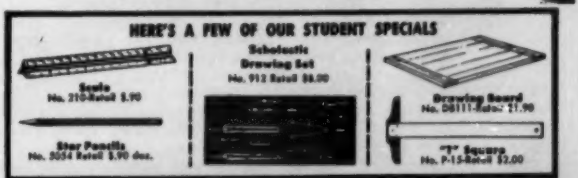

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NEW PUBLICATIONS

(Continued from page 32A)

9 in., illus., $15. Philosophical Library, New York, N. Y.

This book is an excellent guidebook for British foundry workers, such as apprentices, students, craftsmen, and executives.

Each of the 13 chapters is written by a specialist who knows his subject well.

The 13 chapters discuss ferrous metals, heat treatment in the foundry, nonferrous alloys, aluminum alloys, melting furnaces, pattern equipment, molding sands and dressings, molds and mold making, molding machines, modern molding developments, fettling practice, and foundry mechanization.

The appendix comprises two worthwhile articles — one on inspection of castings, and the other on foundry work training.

Applied Drawing and Design

By Everett Scrogin and William Bettencourt. Cloth, 254 pp., 7¾ by 10¼ in., illus., $4.60. McKnight & McKnight, Bloomington, Ill.

This text was revised for the fourth time, to cover the drafting in various fields — mechanical, electrical, and sheet metal, as also the use of drawing instruments.

The book contains 172 problems and 517 illustrations.

The contents include Units I to XVI and cover topics on mechanical drawing; working equipment; beginning to draw; lettering; measuring and dimensioning; views, shapes, and positions of objects; sketching; machine drawing; woodworking drawing; sheet-metal drawing; electrical drawing symbols and diagrams; architectural drawing; graphs, charts, and maps; tracing and inking; reproducing drawings; and design and color. There are appendices, a reference list, and an index.

56 Graded Problems in Elementary Sheet Metalwork

By Algot E. Anderson. Cloth, 144 pp., 6⅞ by 10 in., illus., $6.80. McKnight & McKnight, Bloomington, Ill.

This text offers an effective medium for the teaching of such basic skills as the reading of drawings, accuracy in layout, cutting, shaping, and assembling.

The projects are graded as to difficulty, and divided into seven units — simple layouts and cuts; soldered laps and seams; riveted construction; oblique lines; cylindrical forms; frustums of cones; and pyramid development and review.

Each unit is designed to offer specific experiences, while making practical, useful articles. The superior pupils, as well as those of average ability, have been kept in mind in each unit.

The Hand Decoration of Fabrics

By Francis J. Kafka. Cloth, 196 pp., 6 by 9 in., illus., $5. McKnight & McKnight, Bloomington, Ill.

This text is written in simple, down-to-earth language, so that the beginner will experience the satisfaction of success. This new book covers stenciling, batik, silk screen, linoleum block, tie dyeing, freehand painting, and novelty decoration. Each chapter presents a different method of application, and includes a historical background of that particular method.

Woodworking for Industrial Arts

By Ira C. Madden. Cloth, 224 pp., 8¾ by 11¼ in., illus., list price $4, school price $3.20. The Goodheart-Willcox Co., Inc., Chicago, Ill.

An interesting book for the student of woodworking or the do-it-yourself enthusiast, or the man who loves to work in his home workshop.

The author is not only an excellent craftsman himself, but an outstanding teacher of woodworking.

The book is well illustrated. The 16 chapters discuss the subject under the following headings: starting in woodworking; the school shop; wood, a construction material; planning, project layout; developing patterns; color insert — wood identification (32 beautifully colored pictures of the various woods used by woodworkers); measuring tools; drilling and boring tools; hand saws; bench planes; inlays enrich the surface; power tools and how to use them; product assembly; wood finishing, project decoration; and shop projects — more than 45 of them.

Stock List

Steel Sales Corporation. Soft cover, spiral, 282 pp., 4⅞ by 8¼ in.

This is a comprehensive catalog of products available from the Steel Sales Corporation. It contains information about cold finished steel; C. R. strip flat wire; sheet steel; spring steel; drill rod; electrical steels; steel tubing; monel, nickel, inconel, and foundry alloys; stainless steels; brass, copper, bronze, nickel, silver; steel wire; welding rod, silver, brazing alloys and flux; aluminum data, accessories and hot rolled mild steel.

Home Workshop Handbook

Curt Johnson, handbook editor. Paper, 192 pp., 6½ by 9¼ in., 75 cents. Science and Mechanics Magazine, Chicago, Ill.

This very interesting book presents 44 practical projects among which may be found a: foldaway workbench, arc welder, power filer-

(Continued on page 36A)

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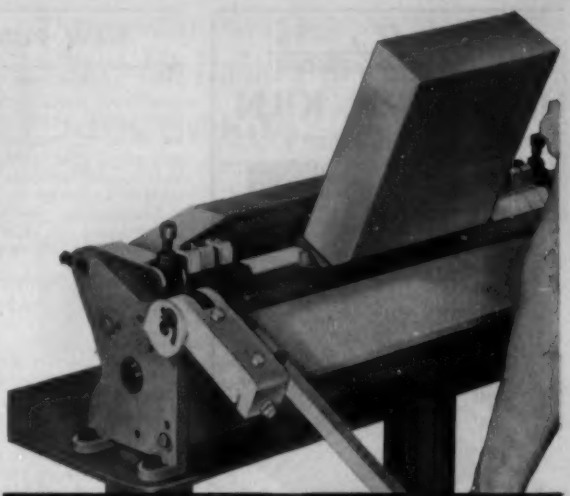

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A Guide to Nuclear Energy

By R. F. K. Belchem. Cloth, 77 pp., 5 by 7½ in., illus., $3.75. Philosophical Library, New York, N. Y.

Both commercial and technical workers need a basic knowledge of nuclear energy and power.

This book explains how nuclear reactors function. It presents the basic principles of nuclear fission; basic constituents of a nuclear reactor; types of reactors, reactor fuels; fuel elements and fuel processing; materials of importance in reactor design; and useful application of radiation.

Graphic Arts

By D. E. Carlsen. Cloth, 158 pp., 6⅞ by 10 in., illus., $3.60. Chas. A. Bennett Co., Peoria, Ill.

This is an excellent text for the beginner who is encouraged throughout the book to acquire a good grasp of the terminology used by the printer, and to acquire the skill needed to perform the manipulative tasks which the printer has to perform

The 13 chapters explain thoroughly all of the fundamentals of composition, describe the platen press, show how to make the layout, describe the auxiliary operations and machines, show how silk screen operations are performed, explain how bookbinding is done, introduce the student to planographic printing, intaglio printing, block printing, photography, papermaking, and office duplicators.

Wood Projects You Will Like

By Louis Barocci. Cloth, 126 pp., 6⅞ by 10⅛ in., illus., $3.95. The Bruce Publishing Co., 400 N. Broadway, Milwaukee 1, Wis.

This book contains instructions for simple projects accompanied by well-executed pen-and-ink drawings and fine photographs, while the more difficult projects include bills of materials and suggestions for construction.

One section of the book is devoted to standard constructions such as the making of drawers and fastening of table tops to the legs, thus avoiding repetition of instructions in several projects.

Some of the items were winners in the annual Ford Foundation Industrial Arts Awards. All have been built by the author and his students at Cudahy High School in Milwaukee.

Physics and Mathematics in Electrical Communication

By James Owen Perrine. Cloth, 268 pp., 8½ by 11 in., illus., $7.50. John F. Rider Publisher, Inc., New York, N. Y.

This is a deep and probing explanation of what happens in electrical circuits that contain resistance, inductance, and capacitance. While it is a penetrating analysis, it is presented in a plain and understandable manner. The author demonstrates a talent for selecting that avenue of approach to analysis which leads to clarity. On a foundation of associated understandable mathematics, replete with numerical examples, the author brilliantly ties together physical concepts and electrical communication.

Calligraphy: Calligraphia Latina

By Johann Georg Schwandner. Cloth, quarto. Price, $10. Dover Publications, New York 10, N. Y.

This magnificent book of plates deserves a wide welcome from artists and art lovers. It provides a fine insight into the best calligraphic art practiced in Austria about the middle of the eighteenth century. The scholarly introduction, translated here as well as reprinted in the Latin original, outlines the history and discusses the cultural values of Greek and Latin calligraphy. The book proper is made up of 158 full-page plates, beautifully reproduced from the original copper engravings. There is here a rich treasury of alphabets, borders, ornaments, symbolic elements, pictures of animals, etc. — all in the calligraphic style. The modern artist can find here endless suggestions for original work. The original artists — Ferdinand von Freisleben, who made the original drawings and, J. Kaspar Schwab, who engraved the plates — had a sense of the beauty of lines and curves not readily found today. The publishers deserve hearty thanks for the fine reproductions.

The Autobiography of an Idea

By Louis H. Sullivan. Paper cover, 330 pp., 5⅜ by 8 in., illus., $1.85. Dover Publications, Inc., New York, N. Y.

This is an autobiography of Louis Henri Sullivan (1856–1924) who is known by builders and architects as the father of the modern skyscraper.

The 15 chapters of the book present this strange man's life under the following headings: The Child; There was a Child went Forth Every Day; and Then Came Spring; A Vacation; Newburyport; Boston; Boston — The New Rice Grammar School; Louis Goeth on a Journey; Boston — The English High School; Farewell to Boston; Chicago; Paris; The Garden City; Face to Face; Retrospect.

(Continued on page 38A)

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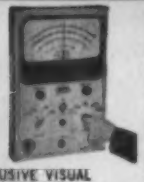

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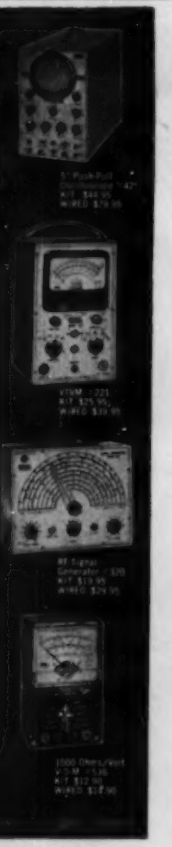

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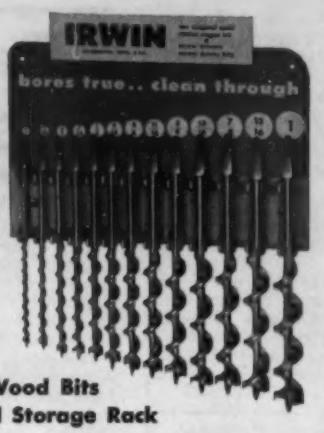

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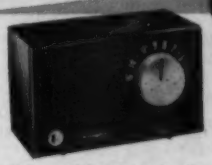

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NEW PUBLICATIONS

(Continued from page 36A)

General Crafts.

By George A. Willoughby and Others. Cloth, 144 pp., 6⅞ by 10 in., illus., $3.80. Chas. A. Bennett Co., Inc., Peoria, Ill.

A fine text covering a number of subjects such as plastics, model making, casting and casting materials, ceramics, wood crafts, metalcraft and jewelry, leathercrafts, graphic arts, and weaving.

The book contains a layout for a general crafts shop, clear explanations for making the various projects, and the illustrations are very good.

Electricity in Aircraft

By F. G. Spreadbury. Cloth, 342 pp., 5¾ by 8¼ in., illus., $8. The Macmillan Co., New York, N. Y.

This excellent text is well written and clearly illustrated. Electrical engineers, technicians, and the ground service crews will welcome the information which it can give them. The electrical power used on modern aircrafts has increased tremendously. The earlier 12-volt systems have given way to 24-volt apparatus and this is being rapidly replaced by 112 volts for d.c., and by 208 volt 3 phase a.c.

The eight chapters of the book describe the generation in aircraft direct current; alternating current and rectified a.c.; the rotary transformer; aircraft storage batteries; switchgear and cables; motors, general utilization equipment in aircraft; and testing and test equipment.

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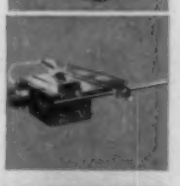

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Business and Personal News

BRODHEAD-GARRETT COMPANY LUMBER CONTEST WINNERS

Winners have been announced in the recent contest conducted by the Brodhead-Garrett Company. The object of the contest was to list the twenty species of lumber which appear in the Brodhead-Garrett Company catalog in the order of their popularity, as based on the company's national school sales.

First place winner — Daniel E. Hess, who is the woodworking instructor at Uniontown Joint Area High School, Uniontown, Pa. Mr. Hess received his B.S. in Education from the Califonia State Teachers College, California, Pa., and his master of arts degree from West Virginia University, and he is in his ninth year of teaching after some time spent in industry and in the Armed Services.

Second place winner — Jerry C. Olsen, metal shop teacher at Richland High School, Gibsonia, Pa. Mr. Olson was also graduated from California State Teachers College in California, Pa., in January of 1957, and has been teaching for the past two years.

Third place winner — Paul Timashenka, who is industrial arts instructor at East-Deer Frazer Union School, Creighton, Pa. Mr. Timashenka received his B.S. degree from California State Teachers College, California, Pa., and his master's degree in Education from the University of Pittsburgh in 1953, and he is in his tenth year of teaching.

Entries were from all parts of the country.

BLACK & DECKER AT THE PLANT MAINTENANCE SHOW

The Black & Decker Manufacturing Company featured their new Heavy-Duty Drum Vacuum Cleaner, a new ¼-in. drill, and the full line of new Black & Decker Heavy-Duty Belt Sanders, as well as Heavy-Duty Electric Hammers and the Black & Decker Furnace Cleaner at the National Plant Maintenance and Engineering Show, which was held January 26 to 29, 1959, at the Public Auditorium in Cleveland, Ohio.

In addition to the featured items, a complete line of metalworking and woodworking tools were exhibited, including drills, scruguns, impact wrenches, magnetic drill presses, nibblers, and shears. They occupied booths 1233 and 1235.

NEW MANAGER FOR ROCKWELL SCHOOL SALES

William E. MacLachlan, assistant manager, school sales for Rockwell Manufacturing Company's Delta Power Tool Division, has been promoted to manager, school sales.

He joined Rockwell in 1952 as manager of Delta's Hoboken warehouse. Before being promoted to his most recent position in 1957, he was school specialist, eastern region from 1953. Prior to joining Rockwell he taught industrial arts in Whitewater, Wis.

A native of Augusta, Wis., Mr. MacLachlan received a B.S. in industrial education from Stout State College in 1949. He is a member of Epsilon Pi Tau, national honorary society for industrial arts and vocational education; American Industrial Arts Association; and the American Vocational Association.

NEW SUBSIDIARY TO BROWN & SHARPE MFG. CO.

Brown & Sharpe Mfg. Co., 125-year-old machine tool builder, has purchased Howe &

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Fant, Inc., of East Norwalk, Conn., manufacturer of turret-drilling and jigless work-positioning devices.

Henry D. Sharpe, Jr., Brown & Sharpe president, announced that Howe & Fant will become a subsidiary known as the Brown & Sharpe Turret Drilling Division, Inc. It will continue to operate at the East Norwalk plant with its present personnel.

Distribution of products of the new division will continue through Howe & Fant's existing dealers in the metalworking centers of the United States.

Arnold Charlat, formerly the company's vice-president and chief engineer, becomes president of the new subsidiary, succeeding A. S. Howe, Jr. Mr. Howe will continue with the firm, as director.

NEW ALVIN & COMPANY FACILITIES

Alvin & Company, Inc., has recently opened their new 10,000 square foot building, which is in addition to the bulk warehouse which they presently occupy at Windsor, Conn. The new structure will provide up-to-date packing and shipping facilities, and is designed to meet all customer needs.

Alvin Shoham of Alvin & Company extends a most cordial welcome to both old and new accounts to drop in whenever convenient.

INDUSTRIALIST HONORED FOR 40 YEARS OF SERVICE

Perry C. Goodrick, former president of the Can-Pro Corporation, manufacturers of Student Aprons and Instructors Coats, was honored at a testimonial dinner in Fond du Lac, Wis., at which his business associates presented gifts and lauded his 40 consecutive years with the firm, a subsidiary of the J. M. Nash Co., Inc., of Milwaukee, Wis.

Mr. Goodrick retired in August, 1958, and is now consultant for the corporation.

Descriptive Material

PRODUCT INFORMATION BULLETIN

The Columbian Vise & Mfg. Company have announced a product information bulletin on their new line of magnesium levels.

The bulletin features a description of "finger-tip" adjustable, replaceable vials of 2-piece construction. By slightly loosening 2 mounting screws, the vials can be easily turned until proper adjustment is attained. This is reputed to assure continuous, maximum level accuracy.

An instruction card informing users how to test level and plumb vials for accuracy is now being included with each Columbian Magnesium Level. A free replacement vial will be sent to anyone who requests it on the return postcard that is a part of the instruction card. The level guarantee is also included on the card.

Levels are made of extruded magnesium I beams, ⅓ lighter than aluminum. Levels are available in 7 lengths: 24-, 28-, 30-, 48-, 72-, 78-, and 96-in. sizes. Weights vary from 1¾ lb., each for 24-in. levels to 6½ lb., for the 96-in. size.

Ask for Bulletin LL-8921.

(For further details encircle index code 0417)

NEW KODAK MOTION PICTURE

The role of audio-visual materials in today's elementary and secondary education is outlined for laymen and educators in a new Eastman Kodak informational film, "Pictures Teach at Penfield."

The 19-minute motion picture, on Kodachrome Film and in sound, focuses on the Penfield, N. Y., Central School District, where films, slides, and filmstrips are integral parts of every curriculum.

The lively interest and sense of participation which a student gains from audio-visual resources are demonstrated through the reactions of a brother and sister to learning by film.

"Pictures Teach at Penfield" analyzes a wide range of contributions to learning which can be made by a professionally conducted program of audio-visual education.

Students and teachers play themselves in the new motion picture, which was photographed in classrooms and laboratories of the Penfield school system.

"Pictures Teach at Penfield" is available on free loan for showing to groups interested in education. A print may be scheduled by writing.

(For further details encircle index code 0418)

"THE STORY OF LIGHT AND SIGHT"

"The Story of Light and Sight" is the title of a new unit of supplementary teaching aids for intermediate grade teachers, published by Better Light Better Sight Bureau.

The new materials are designed to develop in school children intelligent habits in the care of the eyes and in the use of light for easy seeing.

(Continued on next page)

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DESCRIPTIVE MATERIAL

(Continued from previous page)

In development for almost 3 years, The Story of Light and Sight was prepared by the School Service Committee of BLBS Bureau. Miss Dorothy Alfke, assistant professor of education at Penn State University and consultant in elementary science to NSTA, was retained as a consultant to the Bureau in this project, and did much of the planning and writing for it. Other representatives of NEA, NSTA, and DESP provided guidance, advice, and review of the materials during their preparation. Medical authorities and lighting specialists also reviewed the materials for authenticity and correctness.

The activity approach is used throughout the program, for which the basic printed piece is a 32-page Student Activity booklet. A Teachers Manual provides additional information, suggestions for use of the unit and suggestions for additional enriching activities. The NEA Handbook, "Teaching About Light and Sight," is provided with the unit as additional reference materials for the teacher.

A folder describing the program, including prices of the items, is available without charge.

(For further details encircle index code 0419)

NEW SAMS BOOK

Howard W. Sams & Co., Inc., announces the publication of *101 Ways to Use Your Oscilloscope*, by Robert Middleton. It covers the many possible uses of the oscilloscope. A total of 109 special notes supplement the 101 uses described. Complete information specifies equipment needed, connections required, proper procedure and methods for the evaluation of results. A total of over 400 illustrations of waveforms and test setups are also included.

This is a companion to *101 Ways to Use Your Sweep Generator*, by the same author, released November, 1958.

Catalog No. TEM-2, 180 pp., 5½ by 11 in., $2.50, this book is sold through electronic parts distributors or is available from Howard W. Sams & Co., Inc.

(For further details encircle index code 0420)

FOLDER ON PROJECT DESIGNS

O'Neil-Irwin Mfg. Company, makers of Di-Acro Precision Machines for school and industry, are offering their new folder entitled "Metal Project Ideas with Variations in Design," which has just been published. The author is Dr. Donald G. Lux.

The eight design problems in the folder each offer five varied solutions. The problems presented are primarily aimed at beginning metalworkers. These materials are intended to help students toward eventual personal refinement of detailed project plans, according to the author. Dr. Lux further states:

"Students who build projects along the lines proposed in this folder will gain an understanding of practical design criteria and techniques. They will also increase their knowledge of kinds and characteristics of metals and of common metal-forming tools, machines, and processes. Furthermore, total learning should be increased because the experience will be both educational and personally satisfying since each individual will make a project he designed and planned."

To help defray the cost of publishing and mailing the project materials, a charge of 25 cents has been placed on each project folder. Cash, money order, or check in the proper amount must accompany all requests for the folder.

(For further details encircle index code 0421)

REMINGTON RAND BOOKLET

A method of using a standard manual or electric or proportional-spacing typewriter for special impressions needed in the field of electronics and electricity is the subject of a new booklet just published by Remington Rand. It is the first in a series designed to show how any of 18 different fields can make profitable use of interchangeable typewriter type.

Not only does this method insure clean, neat type for ordinary purposes, but for specialized requirements as well. In the case of electricity and electronics, many complex symbols, equations, and formulae are needed, the characters for which simply do not exist on presently available typewriters in such convenient form. They have to be tediously handwritten, or special type bars installed. Both methods are time-consuming and expensive.

Now, with interchangeable type heads, the typist can insert special type characters herself in a matter of seconds. There is no need for an extensive knowledge of typewriter parts or for relearning the keyboard. Only the type face is changed. It snaps into place in one, simple operation and is locked — or removed — with special magnetized tweezers.

Printwork is consistent, producing an impressive, finished look; a wide range of typewriter ribbons can be used with this type, further proof of its flexibility.

A copy of this booklet can be obtained by asking for R 8964.5.

(For further details encircle index code 0422)

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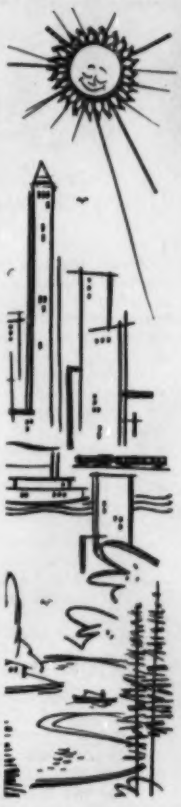

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Shop Equipment News

MULTI-PURPOSE DESK AND DRAFTING TABLE

Gramercy Guild Group, Inc., have introduced a multi-purpose Desk and Drafting Table. The table top measures 37 by 28 in., the desk is 30 in. high, and the drawing board measures 37 by 26 in.

Multi-Purpose Desk and Drafting Table

The unit is made of fine European Beechwood and manufactured in Germany with the well-known old country craftsmanship for long lasting use. Custom alterations are available on request.

The table top is made of hard plastic materials and rolls back to free the drawer in which the drawing board rests. The drawing board can be used flat or tilted to 70 deg.

A drafting machine can easily be applied and stored with the drawing board in the top drawer. There is ample drawer space on the right.

This combination desk and drafting table allows the student to sit instead of leaning over the board, and it also presents uses for the desk alone.

Further information available on this unique desk and drafting table; information to be had also on drafting machines made with the precision craftsmanship of the firm of Clemens Riefler.

(For further details encircle index code 0401)

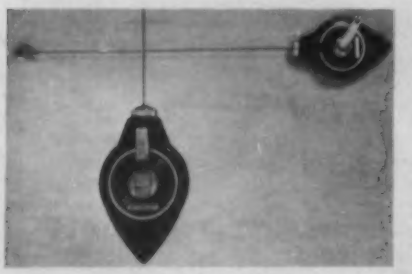
THE STANLEY CHALK-O-MATIC

A new self-chalking chalk line reel, the Stanley Chalk-O-Matic, in 50- and 100-foot lines, has been introduced by Stanley Tools, division of the The Stanley Works. Teardrop shaped case serves as a perfectly balanced and symmetrically built-in plumb bob, easy to use and easy to see.

The precision fit of the die-cast aluminum sections prevents leakage. The handle serves as a lock when using the Chalk-O-Matic as a plumb bob, and folds flush into the case for compact carrying.

The filler cap remains attached to the line when the case is being filled and cannot become misplaced. A one-piece felt gasket serves as wiper and sealer and assures uniform distribution of chalk coating; guards against leakage. The line can be replaced easily and quickly without dismantling hub or handle from the case. High-grade chalk refills in red, white, and blue, packed in plastic envelopes, are available. Replacement top-grade masons' quality line wound on handy plastic dispensers is also available in 50- or 100-foot lengths. Fifty-foot Chalk-O-Matic is No. 1050 and one hundred-foot is No. 1100, available at hardware distributors.

Further information to be obtained by writing.



The Stanley Chalk-O-Matic

(For further details encircle index code 0402)

NEW, SMALL, FAST TURRET LATHE

The Challenge Machinery Company have announced their new type small Turret Lathe which offers faster and more accurate machining of small parts.

Challenge Precision Turret Lathe

Special features include the rapid indexing control; a steady rest which permits accurate centering of parts to be machined; and holding of parts accurate to within .0002 in. The steady rest also opens and closes automatically at the start of the cutting cycle.

As much as 50 per cent savings in machining time on short run operations or secondary operations are reported by users of this new machine.

This new Challenge 625 Precision Turret Lathe has a maximum collet capacity of .625 in. It has a range of six speeds forward and reverse with speeds available from 720 to 2640 r.p.m., with one motor and 1128 r.p.m., to 5275 with another.

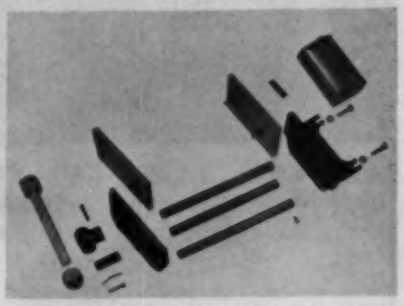
Rapid control of speed changes is provided by Hi, Low, Reverse, and Stop push buttons conveniently located on the front of the machine.

(For further details encircle index code 0403)

WILTON STUDENT PROJECT KITS

Wilton Tool Manufacturing Co., Inc., have just introduced their new student project kits for making bench and woodworker's vises.

These new kits are particularly valuable because they give the student a basic tool that he will really use at home or work in the future. These kits come complete in every detail, with raw parts, nuts, bolts, pins, and rivets; even gray lacquer and blank brass name plate is provided for use on the finished product. The illustrated instructions are easy to follow.



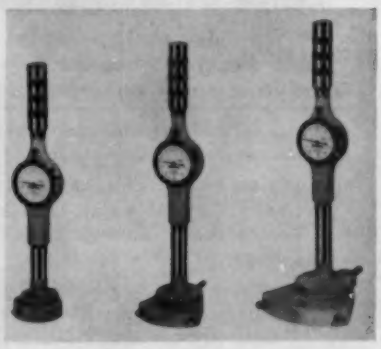
Woodworker's Vise Shop Project Kit includes all parts including lacquer and brass name plate

More complete information available.

(For further details encircle index code 0404)

NEW STARRETT DIAL BORE GAGES

L. S. Starrett Company are introducing their No. 84 Series Dial Bore Gages for measuring and inspecting cylindrical bores. Designed for inspection as well as checking hole sizes during machining or grinding operations, these new dial bore gages will measure bore diameter in ten-thousandths or half-thousandths, depending on the model chosen, and will indicate variations from true bore such as taper, out-of-round, bell mouth, hour glass, or barrel shape.



No. 84 Series Dial Bore Gages

They are made in three sizes to cover a range of 3 to 12½ in., and are available in six models to provide a choice of indicator readings in .0001 in., or .0005 in. Design features include: aluminum handle, indicator housing and gaging head for lightweight and easy handling; simple adjustment for wide measuring range by means of an adjustable and interchangeable, positive locking range screw; self-centering in bore with two spring-loaded centralizing plungers and the range screw providing three-point wall contact; and separate spring-loaded gaging contact for accurate, reliable, repetitive readings.

Complete description and specifications are available on request.

(For further details encircle index code 0405)

(Continued on page 44A)

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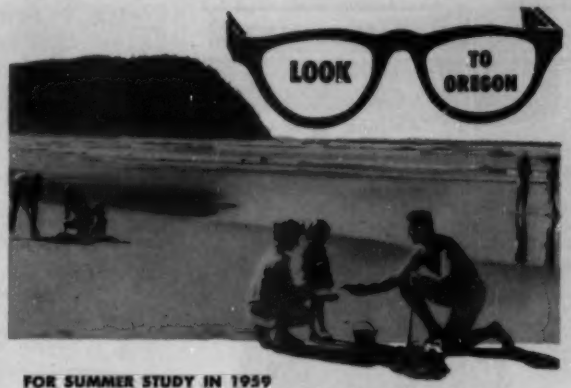

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Six semester hours credit may be earned in each of the five-week sessions.

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Second Term, July 13 — August 15

For additional information write Director of Summer Session, Bradley University, Peoria, Illinois

(For more information from advertisers, use the postcard on page 49A)

SHOP EQUIPMENT NEWS

(Continued from page 42A)

NEW ESTWING DRYWALL HAMMER

Estwing Manufacturing Company have announced a new Drywall Hammer. This tool is forged in the Estwing one-piece head-handle unbreakable construction of fine tool steel, plus their vinyl-nylon cushion grip, which absorbs all shock, is easy on the hands, and cannot come off, loosen, or wear out.

Estwing Drywall Hammer

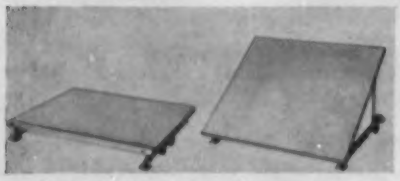
The new Drywall Hammer can be used right up against the ceiling, as the blade angle allows for clearance; pole is beveled and scored just right. No more broken handles or loose heads because of its one-piece head-handle construction. Weight of head is approximately 11 oz.; length of tool over all is 13½ in.

Please write for further information.

(For further details encircle index code 0406)

NEW EZ-EASEL PORTABLE DRAWING BOARD

Garrett Tubular Products, Inc., have introduced their new EZ-Easel Portable Drawing Board. It features an improved method of adjusting drawing boards from flat, horizontal position to vertical, standing position. It is designed for schools, shops, office, home, or traveling, and is used by draftsmen, artists, and students.



New Ez-Easel Portable Drawing Board

It is of a lightweight cast aluminum construction and top grade drawing board, convenient to store when folded flat. With easy adjustment to lock in any position by turning knobs, it has nonskid legs that prevent sliding, or may be bolted permanently to any flat top table.

It may be purchased complete with a 20 by 24-in. drawing board, or just the adjustable base and legs may be purchased for installation on larger or smaller drawing board. All drawing boards are equipped with metal pencil bar.

Further information on prices, etc., available.

(For further details encircle index code 0407)

"LEROY" HEIGHT AND SLANT CONTROL SCRIBER

Keuffel & Esser Company have announced a new "Leroy" Scriber that can be adjusted to form template characters of varying heights and slant angles without changing character width.

New "Leroy" Scriber

Given the catalog number 3237-12, this latest addition to the famous "Leroy" Scriber line can form characters either vertical or slanting at any angle up to 45 degrees forward, and any height from 60 to 150 per cent of the size of the figures represented on the drawing template used.

The "Leroy" Height and Slant Control Scriber takes pens from -0000 to -8. It can be used with "Leroy" Lettering Templates up to size -500 C.

Height-slant adjustment of the new scriber is simple. Just loosen the large center knob and move the arm so that the small red circle on the arm lies directly under the intersection of the "degree slope" and "per cent height" lines desired. Re-tighten the knob and letter.

Additional information is available.

(For further details encircle index code 0408)

EICO NEW GRID DIP METER

Electronic Instrument Company, Inc., have made available their new EICO Model 710 Grid Dip Meter which is a versatile, stable, rugged, and compact design. Basically a VFO with a microammeter in its grid circuit, the No. 710 determines the frequency of other

EICO Grid Dip Meter

oscillators or tuned circuits. It features a sensitivity control and phone jack to facilitate "zero beat" listening. It is easy to hold and thumb-tune with one hand, and provides continuous coverage of broadcast, FM, ham and TV bands in 7 ranges, with a complete set of pre-wound, pre-calibrated 0.5 per cent accuracy coils supplied.

"Ham" uses for the No. 710 include: pretuning and neutralizing transmitters, power indication, locating parasitic oscillations, antenna adjustment, correcting TVI, general debugging with a transmitter power off, determining, C, L, Q.

Electronic uses include: alignment of traps, filters, IF's, peaking compensation networks, and as signal or marker generator.

Further information on specifications on frequency range, meter movement, plug-in coils, circuit, tuning, tube, scale, power requirements and supply, dimensions, weight, and prices are available upon request.

(For further details encircle index code 0409)

CORRESPONDING CODE INDEX NUMBERS TO BE ENCIRCLED CAN BE FOUND ON THE CARDS IN THE READER'S SERVICE SECTION

CONVERT-A-DRUM SWING-TOP LIDS

General Scientific Equipment Company have made available to business, industry, and institutions, their new product — the ingenious Swing-Top Lid, which quickly and attractively converts empty drums of 15-, 30-, and 55-gallon capacity into efficient, safe, and sanitary waste receptacles. The new lid does away with the unsightly, fire-hazardous situation of using uncovered drums for waste disposal.

Convert-A-Drum Swing-Top Lid

They announce a complete "kit," including one swing-top Convert-A-Drum Lid, a can of Instant-Dry Spray-On to give the unsightly drum an attractive new look, and one Easy-On Burlap Bag that hooks conveniently inside the drum to prevent corrosive action of waste and to facilitate disposal.

The lids are made of fire-resistant heavy steel, each containing two free-swinging doors with rust proof baked green enamel finish. The lids are easily attached, in a few seconds, to any standard drum. Convert-A-Drum swing-top lids are available as individual units, or as part of the "kit" mentioned above.

Further information available.

(For further details encircle index code 0410)

HOSSFELD HANDRAIL AND SCROLL DIES

Hossfeld Manufacturing Company have introduced two new attachments to further the versatility of the Hossfeld Universal Pipe, Bar and Angle Iron Bender.

Handrail capping can be bent into lambs' tongues, volutes and edgebends with the Hossfeld No. 2 Bender and these special dies. Lambs' tongues can be formed in two quick operations. Edgebends can be formed to as low as 9 in. inside radius, or as large as desired simply by changing to a larger inside radius block. All can be bent manually with little effort.

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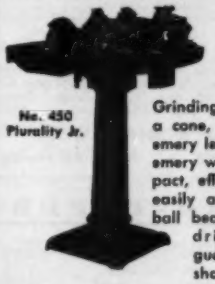

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Hossfeld Handrail and Scroll Dies

Single and double turn scrolls can be formed in seconds. The single turn die is made in two sizes, small and large. The small die forms a 2½-in. dia. scroll, the large die 4-in. dia. The 2-turn die forms a 6-in. dia. scroll. When properly set up, any number of exact duplicates can be made with either the No. 1 or No. 2 Bender.

The handrail capping and scroll dies make the Hossfeld even more versatile. It will also bend rounds, pipe, flats, tubing, squares, conduit and angle iron. Angle iron can be bent with the flange either in or out. Flatstock can be bent either flatways or edgeways, and conduit either rigid or thinwall, all without the use of mandrels. For hard-to-pull bends on heavier material a hydraulic attachment is available, optionally, for smooth, effortless bending.

Illustrated literature on the Hossfeld Bender showing samples of bar, angle iron and pipe bends, plus handrail forms and scrolls and the dies available, may be had by writing.

(For further details encircle index code 0411)

NEW CRAFTOOL DUST BOY

Craftools, Inc., have introduced the new Dust Boy — a powerful (1½ h.p.) shop-vacuum and dust collector. It is equipped with a 14-gallon drum, small enough to be extremely portable, but with a large capacity for those wood chips, sawdust, and dirt found in shops, garages, attics, and greenhouses.

Craftool Dust Boy

Supplied with a 2½-in. diameter hose, twice the size of the average vacuum hose, which will not clog on the rough refuse, debris falls directly into drum, bypassing the motor.

Fittings are heavy plastic, tapered for quick attachment. The unit is supplied with an adapter to take any standard 1-in. vacuum hose.

The Craftool Dust Boy is the answer to

(Continued on next page)

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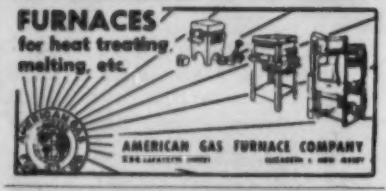
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SHOP EQUIPMENT NEWS

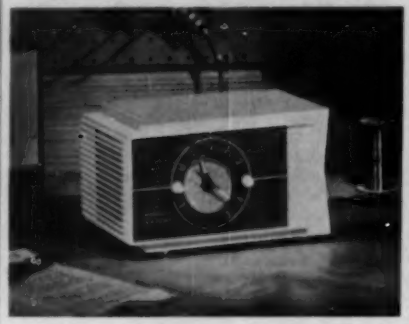
(Continued from previous page)

those rough cleaning operations. It is available through leading hardware and equipment dealers, or directly from Craftools, Inc.

(For further details encircle index code 0412)

KNIGHT-KIT "RANGER" CLOCK-RADIO KIT

Allied Radio Corporation announces the release of its new, low-cost Knight-Kit "Ranger" Clock-Radio in easy-to-build modulized form. This kit features an efficient superhet radio for excellent reception of the entire broadcast band. It also has a luminous Telechron clock with a "sleep switch," plus an automatic radio



Knight-Kit "Ranger" Clock-Radio Kit

wake-up/alarm switch. Module plug-in circuits and a printed circuit board make assembly easy. The builder simply plugs complete modulized circuits into the board and makes a few solder connections — there is no need to solder individual components in place.

The Knight-Kit "Ranger" is designed to perform many functions: the user can go to sleep with music (radio shuts off after desired time lapse up to one hour); wake up to music; wake up to music (followed in ten minutes by an alarm signal); plug in a coffeemaker to go on automatically at any time desired. It will handle appliance rated to 15 amps (1800 watts).

The handsomely styled case is finished in blue and white; size is 6 by 9⅝ by 5⅜ in. Kit is supplied complete with case, tubes, all parts, wire and solder, and instructions. It is listed under stock No. 83 Y 737.

(For further details encircle index code 0413)

NEW ROLLING MILL MICROMETER

A new Rolling Mill Micrometer, No. 18, especially designed for measuring sheet or strip metal as it rides off the rolls has been developed by the Industrial Products Division of Brown & Sharpe Manufacturing Company.

This rugged tool, with a one-inch range by thousandths is equipped with plastic handle and large winged locking screw to permit its use even while wearing large protective gloves. Rugged construction will withstand rough treatment in many steel mills and other applications.

Extra large dull chrome finished barrel and thimble with large figures and black graduations provide ease of readability. Beveled spindle end and anvil allows the "mike" to slide smoothly onto work.

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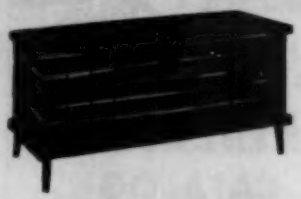
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Brown & Sharpe's Rolling Mill Micrometer features easy grip handle for protection while "miking" hot metal

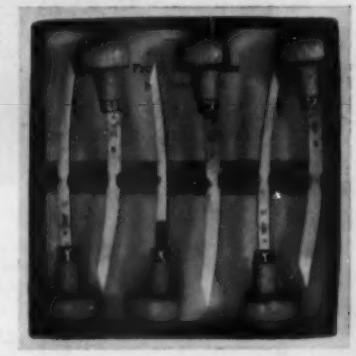
Winged locking screws can be placed on either side for convenience. The anvil has simple zero adjustment and the relationship between the spindle and thimble is fixed so that it will not change because of excessive force in turning the thimble.

For details write for Bulletin No. M67.

(For further details encircle index code 0414)

GRAVERS FOR WOOD BLOCK CUTTING

Frank Mittermeier offers this set of 6 gravers, consisting of 2 round 3 and 10mm., 2 flat 2 and 10mm., Lozenge 3mm., wide, and knife. Tools are slightly bent for clearance



Gravers for Wood Block Cutting

of hand and to make it easier to work on curved surfaces. They are perfect for wood block cutting and engraving and general utility use.

Further information will be furnished on request.

(For further details encircle index code 0415)

DIETZGEN'S NEW BOARDEX DRAWING BOARD

Eugene Dietzgen Company have introduced their new Boardex Drawing Board Cover Paper which offers designers and draftsmen many important advantages.

A full roll of this plasticized material, 20 yards long, is available in either the 36-in. width, or the 42-in. width. It keeps the drawing board new, sheds pencil dust, and wipes clean in a flash.

The "Eye Ease" green color eliminates reflection and eye strain for greater draftsman efficiency.

Further information available.

(For further details encircle index code 0416)

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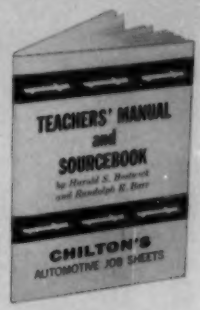

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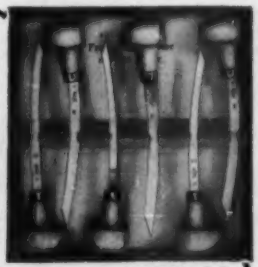

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